EXHIBIT A

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

IN RE PG&E CORPORATION SECURITIES LITIGATION	) Case No. 3:18-cv-03059-EJD) Honorable Edward J. Davila

EXPERT REPORT OF CHAD COFFMAN, CFA

December 23, 2024

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I. INTRODUCTION

1. My name is Chad Coffman. I am the President of Peregrine Economics, a Chicago-based firm that specializes in the application of economics, finance, statistics, and valuation principles to questions that arise in a variety of contexts, including, as here, litigation. I have been asked by counsel for the Lead Plaintiff in this matter to examine and opine on whether certain securities issued by PG&E and its subsidiaries ("PG&E" or the "Company") traded in efficient markets during the period from April 29, 2015 through November 15, 2018, inclusive (the "Class Period").[1] The PG&E publicly traded securities I have been asked to consider include PG&E common stock ("PG&E Common Stock" or "Common Stock"), PG&E preferred securities ("PG&E Preferred Securities" or "Preferred Securities"), and certain PG&E notes ("PG&E Notes" or "Notes"). I refer to these collectively as the "PG&E Securities."

2. In addition, I have been asked to opine on whether calculating damages in this action is subject to a common methodology under Section 10(b) of the Securities Exchange Act of 1934 (the "Exchange Act") and SEC Rule 10b-5 adopted thereunder (collectively "Section 10(b)") as well as Section 11 of the Securities Act of 1933 (the "Securities Act") for class members with such claims.

3. The materials I have considered in forming my opinions are summarized in **Appendix A**. Peregrine Economics is being compensated at an hourly rate of $850 per hour for my work in this matter and at standard hourly rates for work performed by members of my staff

[1] "Complaint" refers to the Third Amended Consolidated Class Action Complaint for Violation of the Federal Securities Laws, filed May 28, 2019, *In Re PG&E Corporation Securities Litigation*, Civil Action No. 3-18-cv-03509-EJD. Unless otherwise noted, all emphasis in this report is added. All timestamps cited in this report are in Eastern Time unless otherwise noted.

acting under my supervision and direction.[2] My compensation is in no way contingent on the outcome of this case. My qualifications are described below.

4. I reserve the right to amend this report to reflect new information that becomes available to me in light of further proceedings in this matter, including additional discovery and/or future rulings from the Court.

II. QUALIFICATIONS

5. I hold a Bachelor's Degree in Economics with Honors from Knox College and a Master's of Public Policy from the University of Chicago. I am also a CFA charter-holder. The CFA, or Chartered Financial Analyst, designation is awarded to those who have sufficient practical experience and complete a rigorous series of three examinations over three years that cover a wide variety of financial topics including financial statement analysis and valuation.

6. I, along with several others, founded Peregrine Economics in January 2024. Before starting Peregrine Economics, I served as the President of Global Economics Group, which I co-founded in March 2008.[3] Prior to starting Global Economics Group, I was employed by Chicago Partners LLC for over twelve years. During my career, I have been responsible for conducting and managing economic analysis in a wide variety of areas including securities valuation and damages, labor discrimination, and antitrust. I have been engaged more than one hundred times as a securities expert both within and outside the litigation context. My experience in class action securities cases includes work for plaintiffs, defendants, D&O insurers, and a prominent mediator (Hon. Judge Daniel Weinstein (Ret.)) to provide economic analysis and opinions in

[2] Prior to January 1, 2024, Global Economics Group was being compensated at an hourly rate of $850 per hour for my work on this matter and at standard hourly rates for work performed by members of my staff acting under my supervision and direction. My agreement with Counsel transferred to Peregrine Economics on January 1, 2024 and the terms of that agreement otherwise remain unchanged.

[3] Prior to March 16, 2011, Global Economics Group was known as Winnemac Consulting, LLC.

dozens of securities class actions as well as other matters. As a result of my involvement in these cases, much of my career has been spent analyzing how securities prices react to new information and evaluating damages in securities-related matters.

7. My qualifications are further detailed in my curriculum vitae, which is attached as **Appendix B**.

III. SUMMARY OF OPINIONS

8. After analyzing the PG&E Securities during the Class Period and giving careful consideration to the efficiency factors described in detail throughout this report for claims under Section 10(b), I have formed the opinion that the markets for the relevant PG&E Securities were efficient during the Class Period. **Exhibit 1** is a descriptive list of all the securities with Section 10(b) claims I have analyzed and found to be efficiently traded.

9. I have also formed the opinion that consistent with plaintiff's theory of liability under Section 10(b), damages in this action can be calculated on a class-wide basis using a common methodology. I also conclude that using the statutory formula for damages under Section 11, any damages under the Securities Act can be calculated on a class-wide basis using a common methodology. These opinions are based upon my analysis described below.

10. The remainder of this report is organized as follows: **Section IV** of this report provides an overview of PG&E's business operations and the allegations in this case. **Section V** discusses the reliance requirement for the claims under Section 10(b) of the Exchange Act and the "fraud on the market" theory. **Section VI** introduces the *Cammer* factors and other factors that financial economists and courts apply when evaluating market efficiency under the "fraud on the market" theory. **Section VII** provides the results of my empirical evaluation of each *Cammer* factor and other factors for PG&E Common Stock during the Class Period. **Section**

VIII provides the results of my empirical evaluation of each *Cammer* factor and other factors for PG&E Notes during the Class Period. **Section IX** provides the results of my empirical evaluation of each *Cammer* factor and other factors for the PG&E Preferred Securities during the Class Period. **Section X** addresses how Section 10(b) damages in this matter are subject to a common approach and methodology that can be applied class-wide and discusses Section 11 damages, which can similarly be applied class-wide.

11. I reserve the right to amend this report, including to reflect new information that becomes available to me in light of the discovery process and/or future rulings from the Court.

IV. OVERVIEW OF THE COMPANY AND ALLEGATIONS

12. PG&E Corporation was founded and incorporated in the state of California.[4] PG&E described its business during the Class Period as follows:

> PG&E Corporation, incorporated in California in 1995, is a holding company whose primary operating subsidiary is Pacific Gas and Electric Company, a public utility operating in northern and central California. The Utility was incorporated in California in 1905. PG&E Corporation became the holding company of the Utility and its subsidiaries in 1997. The Utility generates revenues mainly through the sale and delivery of electricity and natural gas to customers.[5]

13. For the fiscal year ended December 31, 2017, PG&E Corporation reported revenues of $17.1 billion, a net income of $1.7 billion, and listed total assets of $68.0 billion.[6] As of December 31, 2017, PG&E Corporation and the Utility had employed approximately 23,000

[4] PG&E SEC Form 10-K for the fiscal year ended December 31, 2017, cover page.

[5] PG&E SEC Form 10-K for the fiscal year ended December 31, 2017, p. 8.

[6] PG&E SEC Form 10-K for the fiscal year ended December 31, 2017, p. 49.

regular employees,[7] and its Common Stock traded on the New York Stock Exchange ("NYSE") under the ticker "PCG,"[8] with Preferred Securities and Notes.

14. Plaintiffs' Complaint alleges that PG&E and the Individual Defendants[9] issued false and misleading statements and omitted material information during the Class Period, ultimately causing damages to purchasers of PG&E Securities who unknowingly bought PG&E Securities at artificially inflated prices and were damaged when the stock price ultimately reflected the concealed information.[10]

15. More specifically, Plaintiffs allege that during the Class Period, Defendants misstated and omitted material facts with respect to the Company's adherence to vegetation management, powerline maintenance, and wildfire safety regulations.[11] Plaintiffs allege that the undisclosed practices led to a series of wildfires and that as the market learned about the cause of

[7] PG&E SEC Form 10-K for the fiscal year ended December 31, 2017, p. 8.

[8] PG&E SEC Form 10-K for the fiscal year ended December 31, 2017, cover page, p. 48.

[9] The Individual Defendants are Anthony F. Earley, Jr., Geisha J. Williams, Nickolas Stavropoulos, Julie M. Kane, Christopher P. Johns, and Patrick M. Hogan. *See* Complaint ¶¶ 45-50.

[10] Complaint ¶¶ 39-40, 321, 390. I understand Plaintiffs' allegations to include all PG&E publicly traded securities, which would include alleged artificial inflation of PG&E call options and artificial deflation of PG&E put options. There are two basic types of options: call options and put options. A call option gives the holder of the option the right to buy an asset (in this case, PG&E Common Stock) by a certain date, called the expiration date, and at a certain price, called the strike price or exercise price. A put option gives the holder the right to sell an asset (in this case, PG&E Common Stock) by an expiration date at the strike price. Options can be either American or European, with the distinction being that American options can be exercised at any time up until the expiration date, whereas European options can be exercised only on the expiration date itself. The price of an option, also referred to as the "premium," depends on a number of factors, including how the current stock price compares to the exercise price, the amount of time until expiration, anticipated dividends, expected volatility of the underlying stock, and interest rates (*see* John Hull, *Options, Futures and Other Derivatives* (Prentice Hall 7th ed. 2009), pp. 201-204). Option pricing theory clearly suggests that distortion in the price of a company's common stock would also cause distortion in the price of a company's publicly traded options. For example, an often-used formula to value options is the Black-Scholes model, where the price of an option is directly impacted by the current value of the underlying stock (*see* John Hull, *Options, Futures and Other Derivatives* (Prentice Hall 7th ed. 2009), pp. 277-309). In fact, for a call option, subtracting the option strike price (the price at which the option can be executed) from the underlying security price, is referred to as the option's "intrinsic value" (*see* John Hull, *Options, Futures and Other Derivatives* (Prentice Hall 7th ed. 2009), p. 186. Note that the "intrinsic value" for a put option is strike price minus the price of the common stock).

[11] Complaint ¶¶ 1-2.

the fires, PG&E's negligence in causing those fires, and the financial consequences for PG&E, the market price of PG&E Securities were negatively affected, thus harming investors who purchased those securities at artificially inflated prices in the open market (Section 10b claims).[12] Furthermore, Plaintiffs allege Section 11 violations for alleged misstatements in the "Offering Documents" with respect to certain PG&E Notes.[13]

V. DISCUSSION OF RELIANCE ELEMENT

16. Class members' reliance on the alleged misstatements and material omissions is a required element for Plaintiffs' Section 10(b) claims. Plaintiffs assert the fraud on the market theory of reliance in this matter.[14] The "fraud on the market" theory is based on the fact that in an efficient market (one in which widely-available public information is quickly incorporated into the market price of a security), all purchasers implicitly rely on any material misrepresentations or omissions since the value of those misrepresentations or omissions is incorporated into each class member's purchase price. The "fraud on the market" theory was first addressed by the U.S. Supreme Court in *Basic Inc. v. Levinson*:

> … [I]n an open and developed securities market, the price of a company's stock is determined by the available material information regarding the company and its business…Misleading statements will therefore defraud purchasers of stock even if the purchasers do not directly rely on the misstatements…The causal connection between the defendants' fraud and the plaintiffs' purchase of stock in such a case is no less significant than in a case of direct reliance on misrepresentations.[15]

17. The Supreme Court reaffirmed this theory in *Halliburton II*:

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[12] Complaint ¶ 321.

[13] Complaint ¶¶ 630-631. *See* PG&E SEC Form Prospectus filed on February 24, 2016; PG&E SEC Form Prospectus filed on November 29, 2016; PG&E SEC Form Prospectus filed on March 8, 2017; PG&E SEC Form Prospectus filed on April 13, 2018.

[14] Complaint ¶ 321, 459-469; **Section VII** and **Section IX**.

[15] *Basic Inc. v. Levinson*, 485 U.S. 224, 241-42 (1988) ("*Basic*").

> More than 25 years ago, we held that plaintiffs could satisfy the reliance element of the Rule 10b-5 cause of action by invoking a presumption that a public, material misrepresentation will distort the price of stock traded in an efficient market, and that anyone who purchases the stock at the market price may be considered to have done so in reliance on the misrepresentation. We adhere to that decision and decline to modify the prerequisites for invoking the presumption of reliance.[16]

18. As indicated in *Basic* and reaffirmed in *Halliburton II*, in an open, developed and efficient market, market prices reflect what is publicly known about a company. If a company provides the market with misleading information regarding its financial strength or business practices, the market price will be inflated (or deflated) compared to what the price would have been if the truth were known (but-for misleading information). Thus, in an efficient market, where the plaintiffs assert there were material misrepresentations or omissions, all purchasers implicitly relied on those misrepresentations and/or lack of disclosure by paying the inflated (or deflated) price.

19. Determining whether the market for a security was "open and developed" or "efficient" to the degree required for a presumption of reliance under the "fraud on the market" theory is an empirical exercise.[17] The esteemed economist Dr. Eugene Fama, in his seminal research, first outlined definitions of an "efficient market."[18] He described different levels of efficiency which he called "weak-form," "semi-strong-form," and "strong-form" efficiency.[19]

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[16] Halliburton Co. v. Erica P. John Fund, Inc., 134 S. Ct. 2398, 2417 (2014) ("*Halliburton II*").

[17] To recognize the presumption of reliance, the *Basic* Court explained, was not "conclusively to adopt any particular theory of how quickly and completely publicly available information is reflected in market price." *Basic*, 485 U.S. at 248 n.28. The *Basic* Court instead based the presumption on the fairly modest premise that "market professionals generally consider most publicly announced material statements about companies, thereby affecting stock market prices." *Basic*, 485 U.S. at 246 n.24. *Basic's* presumption of reliance thus does not rest on a "binary" view of market efficiency, but rather, market efficiency is a matter of degree.

[18] Eugene F. Fama, "Efficient Capital Markets: A Review of Theory and Empirical Work," *The Journal of Finance* 25, no.2 (1970): p. 383.

[19] "Weak-form" efficiency requires that historical prices are not predictive of future prices. Under this form of efficiency, excess returns cannot be earned using strategies based on historical prices. Therefore, technical analysis will not produce consistent excess returns over time. "Semi-strong form" efficiency implies that all public

20. The market efficiency standard adopted by *Basic* and reaffirmed by *Halliburton II* as necessary for the presumption of reliance conforms most closely with Dr. Fama's "semi-strong form" efficiency. "Semi-strong form" efficiency implies that all publicly available information is reflected in a security's current market price. This implies that security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. *Basic* stated: "In an open and developed securities market, the price of a company's stock is determined by the available material information regarding the company and its business."[20] The Supreme Court's effective adoption of the "semi-strong form" efficiency standard is economically sensible because it recognizes that insiders often possess non-public information and that securities prices do not necessarily reflect this non-public information, but that to presume reliance, the market price must reflect publicly available information.

21. In the next section, I explain the factors that are regularly considered by financial economists and courts in determining whether the market for a particular security is efficient.

VI. *CAMMER* FACTORS

22. In *Cammer v. Bloom*, the Court identified the following factors as relevant to the determination of whether an efficient market exists for a given security: 1) average weekly

information is reflected in a stock's current market price. Security prices adjust to new publicly available information rapidly and in an unbiased fashion so that it is impossible to earn excess returns by trading on that information. Under this form of efficiency, neither fundamental nor technical analysis can produce consistent excess returns. "Strong-form" efficiency implies all information in the market, whether public or private, is accounted for in the market price. In this market, investors cannot consistently earn excess returns over a long period of time even if they have inside information.

[20] *Basic,* 485 U.S. at 241.

trading volume, 2) analyst coverage, 3) market makers, 4) SEC Form S-3 eligibility, and 5) price reaction to unexpected information.[21]

23. The *Cammer* decision relied on Bromberg & Lowenfels' definition of efficiency. As articulated below, the adopted definition of efficiency is consistent with Fama's definition of "semi-strong" efficiency. For the purposes of this exercise, I adopt Bromberg & Lowenfels' definitions for the terms "open," "developed," and "efficient" as described below:

> An *open market* is one in which anyone, or at least a large number of persons, can buy or sell.
>
> A *developed market* is one which has a relatively high level of activity and frequency, and for which trading information (e.g., price and volume) is widely available. It is principally a secondary market in outstanding securities. It usually, but not necessarily, has continuity and liquidity (the ability to absorb a reasonable amount of trading with relatively small price changes).
>
> An *efficient market* is one which rapidly reflects new information in price.
>
> These terms are cumulative in the sense that a developed market will almost always be an open one. And an efficient market will almost invariably be a developed one.[22]

24. While there is a well-accepted economic theory of market efficiency, there are no broadly accepted bright-line empirical tests that allow one to classify a particular market as "efficient" or "inefficient." In my view, the *Cammer* decision identified important metrics to consider when evaluating efficiency for purposes of the "fraud on the market" theory. I also consider a number of other factors that courts have utilized beyond the *Cammer* factors. However, since there are no bright-line tests for efficiency, it is important to consider the

[21] *Cammer, v. Bloom*, 711 F. Supp. 1264 (D.N.J. 1989) ("*Cammer*").

[22] *Cammer,* 711 F. Supp. at 1276 n.17 (citing Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud*, § 8.6 (Aug. 1988) ("Bromberg & Lowenfels")) (emphasis added).

identified efficiency factors as a whole because none of the individual tests or metrics is determinative as to whether a particular market is efficient.

25. In addition to the five *Cammer* factors, I also evaluate, in subsequent sections, the three widely-recognized *Krogman* factors to examine further the efficiency of the market for PG&E Common Stock during the Class Period.[23] These factors are the: 1) company's market capitalization, 2) stock's bid-ask spread, and 3) percentage of stock not held by insiders (the float). Finally, in subsequent sections, I also consider three additional factors to assess market efficiency during the Class Period: 1) the amount of institutional ownership of PG&E Common Stock, 2) autocorrelation (meaning whether there is a pattern in a security's returns so that future returns can be predicted based upon past returns), and 3) options trading. Consideration of these three factors can provide additional evidence of market efficiency (or inefficiency), alongside the *Cammer* and *Krogman* factors.

VII. APPLICATION OF EFFICIENCY FACTORS TO PG&E COMMON STOCK

A. OVERVIEW

26. After giving careful consideration to each of the efficiency factors described in detail below, I find that each factor supports the conclusion that the market for PG&E Common Stock was efficient throughout the Class Period. In addition to the discussion below, **Exhibit 2** summarizes how, for each of the factors examined, the empirical evidence supports a finding that PG&E Common Stock traded in an efficient market. As further background to my analyses, **Exhibit 3** displays PG&E Common Stock closing price and trading volume for each day throughout the Class Period.

[23] *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001).

27. First, the average weekly trading volume of PG&E Common Stock during the Class Period far exceeded benchmarks that courts have established. During the Class Period, the average weekly trading volume for PG&E Common Stock was 19.0 million shares, which represents 3.8% of shares outstanding, higher than the average security traded on the NYSE and/or NASDAQ. Second, numerous securities analysts followed and reported on PG&E during the Class Period. Third, PG&E Common Stock was actively traded on the NYSE as well as numerous other exchanges, fulfilling the *Cammer* factor regarding market makers. Fourth, PG&E filed Form S-3s and Form S-3ASRs before and during the Class Period and met the important eligibility criteria for filing a Form S-3 throughout the Class Period. Fifth, there was a strong cause-and-effect relationship between new Company-specific information and the market price of PG&E Common Stock during the Class Period. Sixth, PG&E Common Stock had a large market capitalization. Seventh, PG&E Common Stock had a low bid-ask spread relative to other exchange-traded common stocks. Eighth, insider holdings were low while institutional ownership was high during the Class Period. Ninth, there was no evidence of persistent or economically meaningful autocorrelation during the Class Period. Finally, there was active trading in PG&E options throughout the Class Period. My analyses of all of these factors support the conclusion that PG&E Common Stock traded in an open, developed, and efficient market at all relevant times during the Class Period.

B. *CAMMER* FACTOR 1: AVERAGE WEEKLY TRADING VOLUME

28. The first *Cammer* factor is the average weekly trading volume of a security. According to one authority cited by the *Cammer* court,

> Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for the security is an efficient one; 1% would justify a substantial presumption.[24]

29. Volume as a fraction of shares outstanding is an important indicator of market efficiency. First, volume is objectively quantifiable and comparable across securities. Second, high volume is generally indicative of continuity, liquidity, and market depth – which are highly indicative of market efficiency.[25] Third, substantial volume would indicate there is likely a market for the collection and distribution of information about the security. As Thomas and Cotter explain, "[t]rading volume was also considered as an eligibility standard because it affects information dissemination to the market, and was an important criterion for investment analysts in deciding which stocks to follow."[26]

30. PG&E Common Stock easily surpasses the threshold level of average weekly trading volume necessary for an efficient market. The average weekly trading volume for PG&E Common Stock during the Class Period was 3.8% of shares outstanding, compared to 2.0% for the average stock listed on the NYSE and NASDAQ. Based on this figure, the weekly trading volume for PG&E Common Stock far exceeds the 1% or 2% threshold cited by *Cammer*.[27]

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[24] *Cammer*, 711 F. Supp. at 1293 (citing Bromberg & Lowenfels).

[25] Continuity means that trades may occur at any time. Liquidity in this context means that investors can convert cash into shares or shares into cash at a price similar to that of the prior trade (assuming no new information). William Sharpe, et al., *Investments*, (5th ed.) Prentice Hall (1995), Chapter 3, pp. 44-45.

Bromberg and Lowenfels define a market that has continuity and liquidity as "the ability to absorb a reasonable amount of trading with relatively small price changes." *Cammer*, 711 F. Supp. at 1276 n.17 (citing Bromberg & Lowenfels).

Market depth refers to "the number of shares that [can] be traded at the quoted bid and ask prices." A deep market will have significant orders on the buy and sell side so that the market can experience a relatively large market order without greatly altering the market price. *See* Yakov Amihud, et al. "Liquidity and Asset Prices," *Foundations and Trends in Finance* 1, no. 4 (2005): p. 317.

[26] Randall S. Thomas & James F. Cotter, "Measuring Securities Market Efficiency in the Regulatory Setting," *Law and Contemporary Problems* 63, no. 3, (2000): pp. 105, 108. Randall S. Thomas is a Director of the Law and Business Program at Vanderbilt University. Dr. James Cotter was an Associate Professor of Finance at Wake Forest University.

[27] *Cammer* 711 F. Supp. at 1293-94 (D.N.J. 1989).

Exhibit 4 plots PG&E Common Stock's trading volume as a fraction of shares outstanding for each week during the Class Period.[28] Indeed, the average weekly trading volume for PG&E Common Stock during the Class Period was 19.0 million shares. This volume of trading supports the conclusion that the market for this security was efficient throughout the Class Period.

31. Another way to measure trading volume is annualized turnover velocity, which is essentially the first *Cammer* factor expressed in dollar terms.[29] To be more specific, instead of looking at shares traded divided by shares outstanding, turnover velocity is the dollar value of shares traded (*i.e.*, shares traded multiplied by price per share) divided by the dollar value of all shares outstanding (*i.e.*, shares outstanding multiplied by price per share). This is the same ratio because the numerator and denominator are multiplied by price per share. The advantage of this measure is that once quoted in annualized terms, PG&E Common Stock's turnover velocity can be compared directly with other publicly traded stocks based on exchange-reported statistics.

32. For example, over the Class Period, the annualized turnover velocity ratio for PG&E Common Stock was 187.7%, as compared with the NYSE and NASDAQ average of 103.4% for the Class Period.[30] Thus, PG&E Common Stock had an average annualized turnover that was substantially higher than the average stock trading on the NYSE and NASDAQ, further supporting that it traded in an efficient market.

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[28] For the purposes of this analysis, a "trading week" consists of 5 consecutive trading days, which may not follow the calendar week.

[29] Turnover velocity is simply the average trading volume as a percentage of shares outstanding (the first *Cammer* Factor) expressed in dollar terms:

Turnover Velocity Ratio = (Volume x Price)/(Shares Outstanding x Price) = Dollars Traded/Dollars Outstanding.

[30] Turnover velocity for the NYSE and NASDAQ is calculated from data provided by the World Federation of Exchanges. *See* https://www.world-exchanges.org/home/index.php/statistics/monthly-reports.

33. In short, the relatively high trading volume in PG&E Common Stock throughout the Class Period supports the conclusion that the market for PG&E Common Stock was efficient.

C. *CAMMER* FACTOR 2: ANALYST COVERAGE

34. The *Cammer* decision stated the following related to analyst coverage:

> … [I]t would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors.[31]

35. Analyst coverage can be important evidence of efficiency. Significant analyst coverage implies that there is sufficient interest in a company and its securities, that there is an active market for information regarding the company and its securities, and that the information is widely distributed.

36. During the Class Period, there was an abundance of analyst coverage for PG&E. **Exhibit 5** shows that there were at least 473 reports issued during the Class Period and 16 separate firms that had equity analysts issue reports on PG&E, including major firms such as Deutsche Bank, UBS, Morgan Stanley, and J.P. Morgan.[32] These reports served the purpose of disseminating publicly available information along with commentary, news, updates, analyses, and recommendations of the analysts to investors. The consistent coverage of PG&E by securities analysts supports the conclusion that PG&E Securities traded in efficient markets throughout the Class Period.

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[31] *Cammer*, 711 F. Supp. at 1286.

[32] I obtained PG&E analyst reports from Investext and Counsel. The number of analyst reports I identify is likely understated. For example, it is clear that analysts from Goldman Sachs and Citigroup participated on earnings conference calls during the Class Period, but I did not have access to research reports of those firms through Investext or Counsel in connection with preparing this report. (*See* "FQ1 2016 Earnings Call Transcripts," *S&P Capital IQ*, May 4, 2016.)

37. Since 1989, when the *Cammer* decision was rendered, there has been a significant increase in alternative methods by which publicly available information about publicly-traded securities is disseminated to investors. For example, since the *Cammer* decision, through the Internet, 24-hour cable news networks, email, RSS feeds,[33] and other media, the ability of individual and institutional investors to obtain information about publicly-traded securities and the market in general has revolutionized the manner in which investors and investment professionals receive and process information.

38. Moreover, information regarding the market price, the current bid-ask spread, and the ability to trade online is available almost instantaneously via the Internet for anyone with an online brokerage account. Thus, in addition to the substantial analyst coverage of PG&E, there were many other sources of public information dissemination. For example, there was substantial public press regarding PG&E. A search for articles classified as related to PG&E by Factiva over the Class Period resulted in 13,469 unique articles.[34] In addition, there were numerous SEC filings available online at the SEC EDGAR search database at no cost, as well as various other sources of public information available throughout the Class Period that I do not attempt to quantify. The degree of news coverage and publicly available information further

[33] RSS is an acronym for Really Simple Syndication or Rich Site Summary. RSS files are formed as XML files and are designed to provide content summaries of news, blogs, forums or website content. The RSS feeds are generally simple headlines and brief descriptions; if the user is interested, the user can click to see additional information. Content viewed in the RSS reader or news aggregator is known as an RSS feed. RSS is becoming increasing popular since it is a free and easy way to promote a site and its content without the need to advertise or create complicated content sharing partnerships. *See* http://www.rss-specifications.com/ and *see also* http://www.rss-specifications.com/what-is-rss.htm.

[34] Factiva is a business information and research tool owned by Dow Jones & Company. Factiva aggregates content from both licensed and free sources, and provides organizations with search, alerting, dissemination, and other information management capabilities. I identified 13,469 unique articles as a result of two searches: (1) one search for "All Sources" with the company field "PG&E Corp" and (2) a separate search for "Major News and Business Sources" with keyword field "PG&E" or "Pacific Gas and Electric Company" but excluding news with the company field "PG&E Corp." Both searches were conducted for the period April 29, 2015 – November 15, 2018. Duplicate articles have been removed by a proprietary function accessible in Factiva's search builder. I acknowledge that this may not reflect all news as the Factiva database is limited to certain sources and content type.

supports the conclusion that there was substantial supply of, and demand for, information regarding PG&E in the public arena throughout the Class Period.

39. In summary, the number of analyst reports and the substantial public dissemination of news and other information regarding PG&E provides evidence of a robust and active market for public information about the Company and evidence that PG&E's Common Stock traded in an efficient market during the Class Period.

D. *CAMMER* FACTOR 3: MARKET MAKERS

40. A market maker is a firm that is ready to buy or sell a particular stock on a regular and continuous basis.[35] The third *Cammer* factor states:

> For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption.[36]

41. The premise that the number of market makers can serve as an efficiency criterion relates to the notion that market makers are:

> … [P]resumably knowledgeable about the issuing company and the stocks' supply and demand conditions (i.e., the "order flow"). Therefore, it is believed the larger the number of market makers in a given security, the more information is available about it and the quicker its dissemination in the price.[37]

42. PG&E Common Stock traded on a major exchange (*i.e.*, the NYSE) with continuous public price and volume reporting, as opposed to an over-the-counter market without volume reporting, which is the context in which *Cammer* indicated this was a relevant

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[35] *See* https://www.investor.gov/introduction-investing/investing-basics/glossary/market-makers.

[36] *Cammer*, 711 F. Supp. at 1293.

[37] Brad Barber, et al. "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *The Journal of Corporation Law* 19, (1994), 291.

criterion.[38] On such over-the-counter markets, there may be reason for concern regarding liquidity and information dissemination. However, these concerns are generally not applicable to stocks trading on large, modern exchanges such as the NYSE and NASDAQ, which are presumed to be efficient, report volume and trade details, and tend to have rules that virtually guarantee a liquid market.[39]

43. The NYSE and NASDAQ are two of the largest and most liquid security exchanges in the world with billions of shares traded each day. Unlike over-the-counter markets that rely on decentralized market makers providing liquidity for trading, the NYSE and NASDAQ rely on a computerized system to match orders and provide quotes.[40] The minimum requirements to be listed on the NYSE or NASDAQ and remain in good standing virtually guarantee a liquid market for that security. Therefore, the number of "market makers" itself is not a particularly relevant metric in this case.

44. Nevertheless, according to TICK data, PG&E was traded on at least 14 public exchanges, including the NASDAQ and NYSE, during the Class Period.[41] Therefore, PG&E

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[38] *See Cammer,* 711 F. Supp. at 1292, citing Bromberg & Lowenfels: "We think that, at a minimum, there should be a presumption – probably conditional for class determination – that certain markets are developed and efficient for virtually all the securities traded there: the New York and American Stock Exchanges, the Chicago Board Options Exchange and the NASDAQ National Market System."

[39] For example, there are rules for minimal market capitalization and specialists are *required* to maintain an orderly market; s*ee* Introduction and Appendices at https://www.nyse.com/publicdocs/nyse/NYSE_IPO_Guide_Third_Edition.pdf. *See also* William Sharpe, et al. *Investments*, (5th ed.) Prentice Hall (1995), Chapter 3, pp. 45-53; Frank J. Fabozzi, et al. *Foundations of Financial Markets and Institutions*, (4th ed.) Prentice Hall, (2010), Chapter 18 – Appendix A.

[40] For NYSE, *see* https://www.nyse.com/market-model. For NASDAQ, *see* https://www.nasdaqtrader.com/Trader.aspx?id=TradingUSEquities.

[41] *See* https://tickapi.tickdata.com/. During the Class Period, PG&E Common Stock traded on at least the following exchanges: NYSE American, LLC, NASDAQ OMX BX, Inc., NYSE National, Inc., FINRA Alternative Display Facility, Cboe EDGA Exchange, Cboe EDGX Exchange, Chicago Stock Exchange, Inc., New York Stock Exchange, LLC, NYSE Arca, Inc., NASDAQ Stock Exchange, LLC, The Investors' Exchange, LLC, NASDAQ OMX PSX, Inc., CBOE BYX Exchange, Inc., and CBOE BZX Exchange, Inc.

Common Stock easily meets the letter and spirit of this factor, further supporting the efficiency of the market during the Class Period.

E. *CAMMER* FACTOR 4: SEC FORM S-3 ELIGIBILITY

45. The fourth *Cammer* factor is SEC Form S-3 eligibility, which states,

> …[I]t would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency.[42]

46. SEC Form S-3 allows certain companies that have previously provided sufficiently high levels of public information to incorporate prior SEC filings by reference into current filings and not repeat the information, since it is already deemed to be widely publicly available.[43] In order to be eligible to issue a Form S-3, among other things, a company 1) must be subject to the Securities Exchange Act of 1934 reporting requirements for more than one year, 2) must have filed all documents in a timely manner for the past twelve months, and 3) must show that it has not failed to pay dividends or sinking funds nor defaulted on debts or material leases. Eligibility to file a Form S-3 is confirmatory evidence of efficiency, not a requirement.

47. A Form S-3 allows a company to register unspecified amounts of different specified types of securities using a single form. I have found no evidence that PG&E was not S-3 eligible throughout the Class Period. In fact, PG&E filed a Form S-3ASR on February 18, 2016 and Form S-3s during the Class Period (*i.e.*, January 4, 2017 and January 19, 2017).[44] While a Form S-3 is a registration statement for specified transactions by certain issues, a Form S-3ASR is a

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[42] *Cammer*, 711 F. Supp. at 1287.

[43] For additional information, *see* www.sec.gov/about/forms/forms-3.pdf.

[44] PG&E SEC Form S-3 filed on January 4, 2017; PG&E SEC Form S-3A filed on January 19, 2017; PG&E SEC Form S-3ASR filed on February 18, 2016.

type of Form S-3, but only for "well-known seasoned issuers."[45] Moreover, I have found no evidence that PG&E was not S-3 eligible throughout the Class Period. Therefore, PG&E meets this Cammer efficiency factor, which supports the conclusion that PG&E Securities traded in an efficient market.

F. *CAMMER* FACTOR 5: PRICE REACTION TO NEW INFORMATION

48. The fifth *Cammer* factor relates to how the price of a security reacts to new, company-specific information and states:

> … [O]ne of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price.[46]

49. Establishing a causal connection between new company-specific events and movements in the market price is convincing evidence of market efficiency. A well-accepted technique often relied upon, both inside and outside of the context of litigation, to establish such a causal connection is called an "event study." An event study is a well-accepted statistical method utilized to isolate the impact of information on market prices.[47] Indeed, academics used event studies as one tool for evaluating the efficient market hypothesis in the first place. Event studies have been used for over 50 years and have appeared in hundreds if not thousands of academic articles as scientific evidence in evaluating how new information affects securities prices.[48]

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[45] https://www.sec.gov/about/forms/forms-3.pdf.

[46] *Cammer,* 711 F. Supp. 1291.

[47] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* 35, no. 1 (1997): p. 13.

[48] John J. Binder. "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting* 11, (1998): p. 111.

50. An event study is a technique used to measure the effect of new information on the market prices of a company's publicly traded securities. New information may include, for example, company press releases, earnings reports, SEC filings, and news reports or analyst reports. An event study is conducted by specifying a model of expected price movements conditioned on outside market factors and then testing whether the deviation from expected price movements is sufficiently large that simple random movement can be rejected as the cause.

51. To analyze cause and effect, I performed an event study to determine whether PG&E Common Stock reacted to earnings announcements in a manner significantly different from how the stock moved on days with the least amount of PG&E-related news.[49] Based on the event study I performed, which explicitly controls for market and industry factors, I find that there is a clear cause-and-effect relationship between new public information about PG&E and the market price of PG&E Common Stock. I now describe in further detail the event study methodology, the events I tested, and the results.

52. A well-accepted method for performing an event study is to estimate a regression model over some period of time (an "estimation window") to observe the typical relationship between the market price of the relevant security and broad market factors.[50] I have performed such an analysis in this matter where I evaluate the relationship between PG&E Common Stock's daily returns (percentage change in price) controlling for the S&P 500 Total Return (the

[49] Days with the least amount of news were days that had five or fewer news articles via the Factiva database, and no analyst reports or SEC filings to my knowledge. There were originally 70 days that I identified based on these criteria. However, there were three days with news articles that I could not dismiss as immaterial: April 27, 2016, October 27, 2016, and March 13, 2018.

[50] A "regression" or "regression model" is a statistical technique for measuring the ability of one or more variables (the "independent variables") to "explain" another variable of interest (the "dependent variable"). In this case, the daily percentage change in PG&E Common Stock (the PG&E Common Stock daily return) is the dependent variable and the contemporaneous daily returns for a market and peer index are the independent variables. For a general discussion of regression analysis, *see* Damodar N. Gujarati, Basic Econometrics, (3rd ed.) McGraw Hill, Chapters 1-3 (1995).

"Market Index") and an equal weighted peer index, hereafter referred to as the "Peer Index."[51,52,53]

53. During the Class Period, PG&E was the subject of an investigation into the cause of the North Bay fires. Once the market began to gain information that PG&E may have been liable for the North Bay Fires, it is possible that the return-generating process of PG&E Common Stock changed in a fundamental way. In particular, I considered the possibility that the Company's potential to face massive new liabilities would cause an increase in the overall volatility of PG&E's valuation and potentially impact its relationship with the Market Index and Peer Index. For purposes of my event study analysis, I therefore employ two estimation windows, demarcated by the events of the North Bay fires. For each trading day analyzed, from the start of the Class Period until October 17, 2017, I constructed a regression model using data from the prior 120 trading days (roughly six months).[54] From October 18, 2017 until the end of the Class Period, I use a fixed-to-rolling regression. More specifically, from October 18, 2017 through April 11, 2018, the 120 trading days immediately following the events of the North Bay fires, I use a fixed regression, and from April 12, 2018 onwards, I use a rolling regression of the previous 120 days.

[51] The Peer Index is a market capitalization-weighted peer index of companies that were members of the Dow Jones Utilities Average Index during the Class Period: American Electric Power Company, Inc., The AES Corporation, American Water Works Company, Inc., CenterPoint Energy, Inc., Consolidated Edison, Inc., Dominion Energy, Inc., Duke Energy Corporation, Edison International, Exelon Corporation, FirstEnergy Corp., NextEra Energy, Inc., NiSource Inc., Public Service Enterprise Group Incorporated, and The Southern Company.

[52] The returns of the Peer Index are net of the S&P 500 Total Return Index.

[53] Earnings announcements, the alleged corrective disclosure events, and two outlier dates have been removed from estimation (*i.e.*, 10/16/2017: a day immediately following one of the alleged corrective disclosures with a highly statistically significant return, and 10/17/2017: another highly statistically significant day where news spread of a suspected wildfire arsonist arrested in California).

[54] A. Craig MacKinlay, "Event Studies in Economics and Finance," *Journal of Economic Literature* 35, no. 1 (1997): p. 15. ("For example, in an event study using daily data and the market model, the market model parameters could be estimated over the 120 days prior to the event.")

54. This method therefore accounts for any sudden changes in the market model due to the events of the North Bay fires and also allows for the relationship between PG&E Common Stock, industry and market factors, as well as firm-specific volatility to update based on that event as well as over time according to the data observed over the most recent 120 trading day period. Use of a rolling model to account for changing volatility and evolving relationships with indices is accepted in peer-reviewed literature.[55]

55. The event study model indicates that there is a positive correlation between PG&E Common Stock and the control variables. In other words, the movement of the Market Index and the Peer Index helps explain the price movements of PG&E Common Stock during the Class Period. For instance, choosing December 8, 2016 (a day in the Class Period) purely as an example, and looking at the regression results based on the 120 days prior to that day, the estimated coefficient for the S&P 500 is 0.86, which means that a 1% rise in the S&P 500 predicts a 0.86% increase in returns for PG&E Common Stock. The estimated coefficient for the Peer Index is 0.95, meaning that the expected return for PG&E Common Stock increases by approximately 0.95% for every 1% increase in the Peer Index over and above the return of the S&P 500. **Exhibit 6** plots the estimated coefficients for the rolling regression models for each day during the Class Period.

56. Another important statistic from the regression is the standard deviation of the errors, which measures the degree of imprecision in the predictions from the model. Put another way, this measure provides a metric for how much unexplained price movement remains in PG&E Common Stock after controlling for the Market Index and Peer Index. For instance, on

[55] Phillip A. Braun, "Good News, Bad News Volatility, and Betas," *The Journal of Finance* 50, (1995): pp. 1575, 1597.

the example date of December 8, 2016, the model predicted that, absent any value relevant new firm-specific information, the price of PG&E Common Stock would increase by 0.30%, because the S&P 500 was up 0.23% and the Peer Index was up 0.10%.[56] Because of the inherent randomness observed in stock price returns, I do not expect the model to predict returns exactly.

57. In this example, I observe an actual return of 0.66%. Thus, the abnormal return for this day is approximately 0.36% (the actual return of 0.66% minus the predicted return of 0.30%). Using the standard deviation of the errors from the regression model, I can tell if this abnormal return is sufficiently large to allow me to reject random movement as the explanation for it, and therefore to conclude that new information caused a change to the Common Stock price.

58. The test for whether randomness can be rejected is done by calculating what is known as a "t-statistic," which represents the number of standard deviations between the actual observation and the prediction. For the example date, an abnormal return of 0.36% represents 0.82 standard deviations or a t-statistic of 0.82 (abnormal return of 0.36% divided by the standard deviation of the errors of 0.0044).[57] Using the standard assumption that, in the absence of new value relevant company-specific news, abnormal returns will be normally distributed around zero, probability theory implies that, based on randomness alone, and using a 95% confidence level and large sample size, the abnormal return should have a t-statistic greater than

[56] The predicted return of 0.30% is found as follows: 0.86 * 0.23% (Coefficient on Market Index times Market Index return) + 0.95 * 0.10% (Coefficient on Peer Index Return times Peer Index Return) + 0.01% (constant term from regression).

[57] The standard deviation of the errors are plotted in **Exhibit** 7. The standard deviation of the error is also known as the standard error. *See* The National Academies Press, Reference Manual on Scientific Evidence, Third Edition, 2011, p. 243: "An estimate based on a sample is likely to be off the mark, at least by a small amount, because of random error. The standard error gives the likely magnitude of this random error, with smaller standard errors indicating better estimates."

1.96 (or less than -1.96) only 5% of the time.[58,59] Stating this point another way, there is a 95% confidence that the actual return will fall within 1.96 standard deviations of the predicted return unless there is some non-random explanation.

59. Since our example date has a t-statistic of 0.82, the abnormal return is not statistically significant at the 95% confidence level, and I cannot reject randomness as the cause of the abnormal price movement with greater than 95% confidence. By contrast, if, on a particular day, one observes an abnormal return that has a t-statistic of a magnitude greater than 1.96 (statistically significant at the 95% confidence level) and one observes new value relevant firm-specific information, one would reject randomness as the explanation with at least 95% confidence and infer that the new information is the cause of the stock price movement.

60. **Exhibit 7** shows that the standard deviation of the errors for PG&E Common Stock varied over the Class Period and that there was a sudden increase in volatility after the North Bay Fires. By adopting the new estimation window as of the North Bay Fires and the rolling regression model during other periods, my event study explicitly addresses the changing Company-specific volatility.

61. To analyze cause-and-effect, I examined the price response of PG&E Common Stock to the fifteen earnings announcements during the Class Period. *See* **Exhibit 8**.

62. There are many academic articles and financial treatises that explain theoretically and demonstrate empirically that the release of company earnings information often (but not

[58] Basic statistics state that for a normally distributed variable, 5% of the observations are expected to fall outside 1.96 standard deviations from the mean. *See* The National Academies Press, Reference Manual on Scientific Evidence, Third Edition, 2011, p. 342: "The normal distribution has the property that the area within 1.96 standard errors of the mean is equal to 95% of the total area."

[59] The financial economics literature often identifies the 90% threshold as a relevant boundary for significance as well. David I. Tabak & Frederick C. Dunbar, "Materiality and Magnitude: Event Studies in the Courtroom," (3rd ed.) *Litigation Services Handbook, The Role of the Financial Expert*, (2001), Ch. 19.

necessarily always) causes a significant change in investors' beliefs regarding the value of an equity security like PG&E Common Stock.[60] Also, newly released earnings reports by a company are an objective set of news to identify and test. Since PG&E (and many other public utilities) are subject to rate of return regulation, there is an expectation that utility companies' earnings will tend to be less volatile than many other companies that are not subject to such regulation. [61] As a result, it would not be at all unusual for many of the earnings announcements to not result in statistically significant price changes. For example, consider the eighth earnings release listed in **Exhibit 8** when before market hours on February 16, 2017 the Company announced Q4 and full-year results that were roughly in-line with earnings expectations.[62] Unsurprisingly, on that day, the abnormal return was near zero at -0.49%, which was not statistically significant.

63. Similar to this example, I analyzed the market reaction to PG&E's other earnings announcements I identified above. In total, of the fifteen earnings announcements PG&E issued during the Class Period, four resulted in statistically significant price movements above the 95% confidence level while an additional three were statistically significant at the 90% confidence level.[63]

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[60] William H. Beaver, "The Information Content of Annual Earnings Announcements: New Insights from Intertemporal and Cross-Sectional Behavior," *Empirical Research in Accounting: Selected Studies, 1968,* supplement to the *Journal of Accounting Research* 6, (1968): pp. 67-92; Robert G. May, "The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes," *Empirical Research in Accounting: Selected Studies, 1971,* supplement to the *Journal of Accounting Research* 9, (1971): pp. 119-163; Joseph Aharony & Itzhak Swary. "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance* 35, no. 1, (1980): pp. 1-12.

[61] Walter Teets, "The Association between Stock Market Responses to Earnings Announcements and Regulation of Electric Utilities," *Journal of Accounting Research* 30, (1992): pp. 274-285.

[62] *See* "PG&E Corporation Releases Full-Year and Fourth-Quarter 2016 Financial Results," *Business Wire*, February 16, 2017; "PCG – 2017 Outlook Reaffirmed; LT CapEx and Ratebase Intact," *Guggenheim*, February 16, 2017; "PG&E's Growth Outlook Still Bright but Already Priced Into Premium Valuation," *Morningstar*, February 16, 2017.

[63] It is not unusual to observe many earnings announcements that are not statistically significant. This happens, for instance, in quarters where there insufficient surprise and/or the firm roughly met expectations, if the firm offered

64. I then compared these results against the 67 days during the Class Period with the least amount of PG&E-related news. Of these 67 days, there were only 4 days with a statistically significant price movement. Thus, during the Class Period, there was a statistically significant price reaction at the 95% confidence level or greater on 26.67% of the days with earnings announcements, but only 5.97% on the days with the least amount of PG&E-related news.[64,65] This is powerful scientific evidence of a cause-and-effect relationship between new publicly released information concerning the Company and changes in the price of PG&E Common Stock.

65. Furthermore, on the 67 days with the least amount of news, the average change in price of PG&E Common Stock was 0.41% after controlling for market and industry factors, while on the fifteen earnings announcement dates, the average change in price of PG&E Common Stock was 1.24% after controlling for market and industry factors. In other words, the average magnitude of abnormal stock price movement on earnings announcement days was about 3 times higher than on days with the least amount of news.[66] Again, this demonstrates that, on days when important company-specific information is released to the market, PG&E's Common Stock price generally moves much more than on days where there is little to no company-specific news. This provides further evidence of a cause-and-effect relationship

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little change in guidance, and/or if there was a mix of both positive and negative information. Similarly, I would not expect PG&E, which has its revenue regulated by the California Public Utilities Commission (CPUC), to have the earnings announcements vary wildly from what the market anticipates.

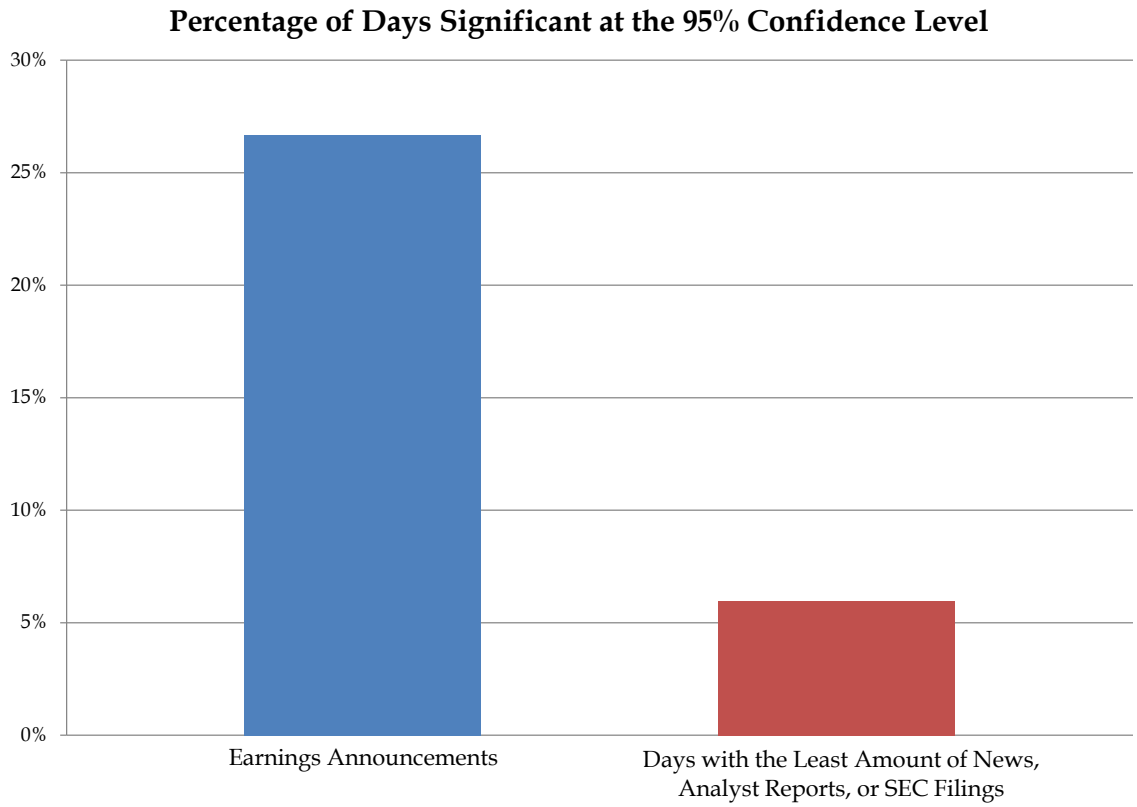
[64] This difference between 26.67% and 5.97% is itself statistically significant at the 95% confidence level using both the Chi-Square test and the Fisher's Exact Test.

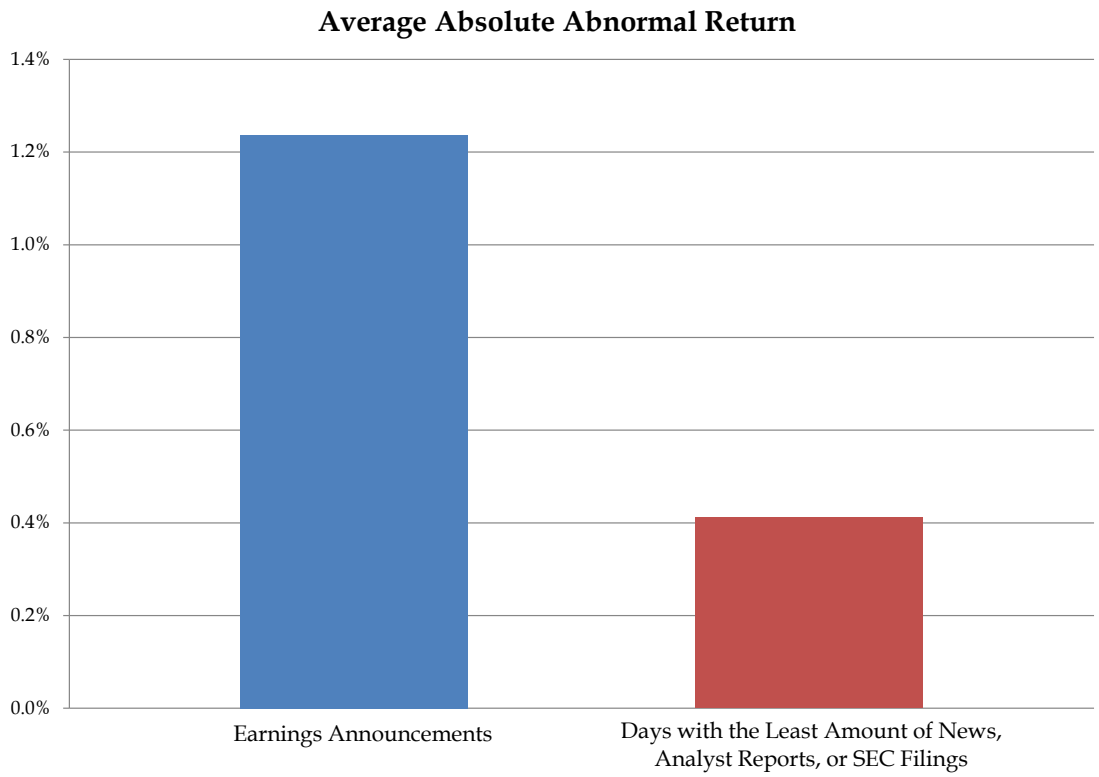
[65] Based on randomness alone, one would expect 5% of the no news days to be statistically significant. The observed rate of 5.97% is not statistically significantly different than 5%.

[66] This difference between 1.24% and 0.41% is itself statistically significant at the 99% confidence level.

between company-specific news and changes in the price of PG&E Common Stock, and thus an efficient market.

66. The bar charts below summarize this analysis while **Exhibit 9** gives more detail.

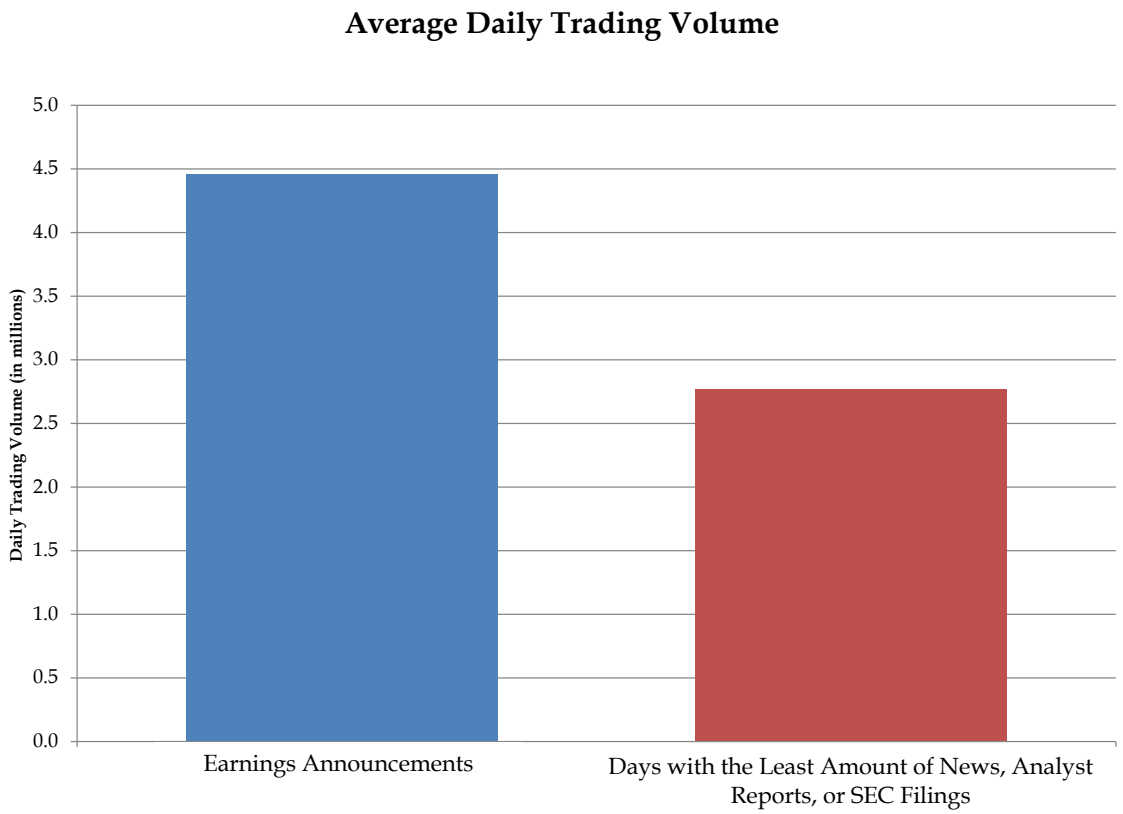




67. Finally, when important Company-specific news is released to the market (*e.g.*, earnings announcements), the daily trading volume of PG&E Common Stock also tends to be much higher than on days when there is no news.[67] *See* **Exhibit 9**. For instance, the average daily trading volume of the fifteen days with earnings announcements was 4.5 million.

[67] William H. Beaver, "The Information Content of Annual Earnings Announcements," *Empirical Research in Accounting: Selected Studies, 1968*, supplement to the *Journal of Accounting Research* 6, (1968): pp. 69, 84.

Compare this to the average daily trading volume of 2.8 million on the 67 days with the least amount of PG&E-related news.[68] The bar chart below summarizes this analysis.



68. The bar charts above reveal a strong cause-and-effect relationship between new, Company-specific news and rapid changes in the price of PG&E Common Stock. The earnings announcement days have a much greater percentage of significant price movements, higher daily trading volume on average, and statistically significantly larger price changes than those found on days with the least amount of news.

[68] This difference between 4.5 million and 2.8 million is itself statistically significant at the 99% confidence level.

69. In conclusion, the event study analysis presented in this section demonstrates a clear cause-and-effect relationship between new, material news and changes in the market price of PG&E Common Stock during the Class Period.

G. *KROGMAN* FACTOR 1: MARKET CAPITALIZATION

70. In *Krogman v. Sterritt*, the court noted that economic theory includes other possible relevant factors for determining whether a stock trades in an efficient market, in addition to the *Cammer* factors.[69] The *Krogman* Court held, "[m]arket capitalization, calculated as the number of shares multiplied by the prevailing share price, may be an indicator of market efficiency because there is a greater incentive for stock purchasers to invest in more highly capitalized corporations."[70] Furthermore, Thomas and Cotter find that firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."[71] Therefore, market capitalization is another quantifiable measure that is likely correlated with efficiency.

71. PG&E Common Stock had a higher market capitalization than the majority of NYSE and NASDAQ stocks during the Class Period, thus suggesting this factor is supportive of efficiency. There were at minimum 480.0 million shares of PG&E Common Stock outstanding throughout the Class Period.[72] Based on the market price, the market capitalization for PG&E Common Stock averaged $28.0 billion during the Class Period, as shown in **Exhibit 10. Exhibit 11** shows that during the Class Period, PG&E Common Stock's market capitalization ranged

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[69] *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001) ("*Krogman*"). The factors identified by the *Krogman* Court are 1) market capitalization, 2) size of float of common stock, and 3) bid-ask spread.

[70] *Krogman*, 202 F.R.D. at 478.

[71] Randall S. Thomas & James F. Cotter, "Measuring Securities Market Efficiency in the Regulatory Setting," *Law and Contemporary Problems* 63, no. 3, (2000): p. 117.

[72] Shares outstanding data obtained from SEC filings.

from the 91st to 97th percentile of the combined NYSE and NASDAQ markets for the applicable quarters during the Class Period.[73] In other words, over the Class Period, PG&E Common Stock had a higher market capitalization than at least 91% of the firms on the combined NYSE and NASDAQ exchanges. This factor is supportive of market efficiency for PG&E Common Stock throughout the Class Period.

72. Given that the market capitalization for PG&E Common Stock was consistently large relative to other publicly traded companies, this factor is supportive of market efficiency for PG&E Common Stock.

H. *KROGMAN* FACTOR 2: THE BID-ASK SPREAD

73. The second *Krogman* factor considers the bid-ask spread for a security, reasoning that: "[a] large bid-ask spread is indicative of an inefficient market, because it suggests that the stock is too expensive to trade."[74] The bid-ask spread is an important indicator of the degree to which a market is developed. The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price. In addition, the wider the bid-ask spread, the more costly it is to arbitrage away small inefficiencies because the cost of the trade could be greater than the perceived inefficiency. Thus, a narrow bid-ask spread supports the presence of an efficient market where the prices reflect publicly available information.

[73] Bloomberg EQS Function.

[74] *Krogman*, 202 F.R.D. at 478.

74. I analyzed bid-ask spreads for PG&E Common Stock during the Class Period. **Exhibit 12** shows that during this period, the time-weighted average percentage bid-ask spread for PG&E Common Stock in each month was between 0.005% and 0.023%. This is well below the average and median bid-ask spread of a random sample of 100 other common stocks trading on the NYSE and NASDAQ in December 2015, a month where PG&E had larger than average bid-ask spread and for which data was readily available.[75,76,77] **Exhibit 12** demonstrates that, in December 2015, PG&E Common Stock had a monthly average bid-ask spread of 0.01%, while a randomly selected group of 100 other common stocks on the NYSE and NASDAQ had a monthly average bid-ask spread of 0.69%.[78] Accordingly, PG&E Common Stock's bid-ask spread was low during the Class Period, and this factor further supports market efficiency for PG&E Common Stock.

I. *KROGMAN* FACTOR 3: PUBLIC FLOAT

75. The *Krogman* Court's final factor is that the public float (*i.e.*, the amount of shares not held by insiders) is considered to be indicative of market efficiency. As shown in **Exhibit**

[75] Note that since the Class Period begins on April 29, 2015, and ends on November 15, 2018, quotes data for April 2015 and November 2018 does not cover the whole month. Even though April 2015 had the largest average percentage bid-ask spread, December 2015 was selected for comparison since it had the next largest average percentage bid-ask spread.

[76] Quote data for PG&E and other publicly traded stock were obtained from the TICK database. *See* https://tickapi.tickdata.com/.

[77] I constructed a random sample because I am not aware of any exchange-wide reporting of average or median bid-ask spreads. Determining the average bid-ask spread for the entire market would be a very costly and data intensive process, therefore I adopted a random sampling methodology. I determined the constituents of the NYSE and NASDAQ for December 2015 and then randomly generated a list of 100 common stock securities. I then calculated the time-weighted average monthly bid-ask spread for December 2015.

[78] The time-weighted average bid-ask spread was calculated by taking the average of the spread during trading hours on the primary exchange of each security, weighted by the amount of time each quote prevails in the market. That is, I take the weighted average quote, with the weight being the number of seconds between that quote and the next quote that occurs. Spread is calculated as the difference between the bid price and ask price divided by the midpoint of the bid-ask spread. I calculated the National Best Bid and Offer using the data filtering procedures described in Roger D. Huang & Hans R. Stoll, "Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE," *Journal of Financial Economics* 41, no. 3, (1996): pp. 313-357.

13, during the Class Period, insiders held just 0.18% of all outstanding shares of PG&E Common Stock, meaning that 99.82% of PG&E's shares were held by non-insiders. This large percentage of shares held by non-insiders – a substantial percentage of which were purchased and held by institutional investors – supports market efficiency.

J. ADDITIONAL FACTOR: INSTITUTIONAL OWNERSHIP

76. Institutional investors are considered to be sophisticated and well-informed, with access to most publicly available information for the stocks that they own. These investors include mutual funds, pension funds, investment banks, and other types of large financial institutions that have substantial resources to analyze the securities they purchase for their portfolios. As **Exhibit 13** shows, 1,446 separate institutions owned PG&E Common Stock during the Class Period, consistently holding over 80% of the public float. The substantial level of institutional ownership of PG&E Common Stock during the Class Period coupled with the high trading volume further supports a conclusion of market efficiency.

K. ADDITIONAL FACTOR: AUTOCORRELATION

77. If previous price movements of a security have the ability to predict future price movements, then it is said to be "autocorrelated." Autocorrelation is relevant to efficiency because if the autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it means that past price movements are not fully reflected in the current price, which would suggest market inefficiency.

78. Autocorrelation may occur from time to time for random reasons or due to the pattern of firm-specific news. Inefficiency would only be indicated, however, if the

autocorrelation were large enough and persistent enough that a trader could consistently earn riskless profits over time.[79]

79. A well-accepted methodology to test for the existence of autocorrelation is to run a regression analysis that tests whether, on average, the abnormal return from the previous day has a statistically significant effect on the abnormal return today.[80] If the previous day's abnormal return has no statistically significant predictive power, then there is no evidence of autocorrelation.

80. **Exhibit 14** displays the autocorrelation coefficient for PG&E Common Stock using the abnormal returns from the event study model described above. The coefficient for the Class Period is not statistically different than zero.[81] Additionally, the quarterly coefficients alternate between negative and positive throughout the Class Period, further demonstrating that there is no directionally consistent autocorrelation. This result is thus inconsistent with the notion that an investor could consistently predict abnormal movements and earn arbitrage profits. Therefore, this factor also supports the conclusion that PG&E Common Stock traded in an efficient market throughout the Class Period.

[79] Doron Avramov, et al. "Liquidity and Autocorrelations in Individual Stock Returns," *The Journal of Finance* 61, no. 5 (2006): pp. 2365, 2367-68; Michael C. Jensen, "Some Anomalous Evidence Regarding Market Efficiency," *Journal of Financial Economics* 6, nos. 2/3 (1978): pp. 95-101.

[80] William H. Greene, *Econometric Analysis*, (6th ed.) Prentice Hall (2008), Chapter 19, p. 644.

[81] The last four trading days have been removed from the analysis. The outlier dates had high volatility and statistical significance due to the events of the alleged corrective disclosures. These dates had an abnormally large impact on the results, making autocorrelation during the Class Period appear to be significant at the 99% level. Removing the outlier dates resulted in an outcome that was not statistically significant.

L. ADDITIONAL FACTOR: OPTIONS

81. In addition to the factors analyzed above, there was also considerable option trading in PG&E Common Stock during the Class Period.[82] Academic articles have demonstrated that options written on existing assets can improve efficiency by permitting an expansion of the contingencies that are covered by the market.[83] Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.[84] Thus, this factor also supports that PG&E Common Stock traded in an efficient market throughout the Class Period.

M. CONCLUSION

82. In summary, every factor analyzed supports my opinion that PG&E Common Stock traded in an efficient market.

VIII. APPLICATION OF CERTAIN EFFICIENCY FACTORS TO PG&E NOTES

83. Corporate bonds and notes are debt instruments issued by corporations.[85] This section is intended to provide a brief introduction and overview of corporate bond pricing principles that are particularly relevant to understanding the evidence in this matter. I do not attempt to outline a complete description of all aspects of bond pricing theory (which is the subject of entire textbooks and additional literature).

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[82] For instance, according to Bloomberg, there were 868,829 PG&E Common Stock put contracts and 1,720,314 PG&E Common Stock call contracts that traded during the Class Period.

[83] Stephen A. Ross, "Options and Efficiency," *Quarterly Journal of Economics* 90, no. 1 (1976): p. 75.

[84] Raman Kumar, et al. "The Impact of Options Trading on the Market Quality of the Underlying Security: An Empirical Analysis," *The Journal of Finance* 53, no. 2 (1998): p. 717.

[85] In this instance, bonds and notes are effectively the same, but firms sometimes refer to debt as "notes" when the maturities are shorter and "bonds" when the maturities are longer (greater than 10 years).

84. **Exhibits 15-1 – 15-29** plot the price of the PG&E Notes at issue in this matter during the Class Period. The PG&E Notes include:

- $849.8 million of 3.950% Plain Vanilla Fixed Coupon Notes due December 1, 2047 (CUSIP ending "HY6");
- $600 million of 4.000% Plain Vanilla Fixed Coupon Notes due December 1, 2046 (CUSIP ending "HR1");
- $450 million of 4.250% Plain Vanilla Fixed Coupon Notes due March 15, 2046 (CUSIP ending "HN0");
- $600 million of 4.300% Plain Vanilla Fixed Coupon Notes due March 15, 2045 (CUSIP ending "HL4");
- $675 million of 4.750% Plain Vanilla Fixed Coupon Notes due February 15, 2044 (CUSIP ending "HH3");
- $500 million of 5.125% Plain Vanilla Fixed Coupon Notes due November 15, 2043 (CUSIP ending "HF7");
- $375 million of 4.600% Plain Vanilla Fixed Coupon Notes due June 15, 2043 (CUSIP ending "HD2");
- $350 million of 3.750% Plain Vanilla Fixed Coupon Notes due August 15, 2042 (CUSIP ending "HA8");
- $400 million of 4.450% Plain Vanilla Fixed Coupon Notes due April 15, 2042 (CUSIP ending "GZ4");
- $250 million of 4.500% Plain Vanilla Fixed Coupon Notes due December 15, 2041 (CUSIP ending "GY7");

- $800 million of 5.400% Plain Vanilla Fixed Coupon Notes due January 15, 2040 (CUSIP ending "GS0");
- $550 million of 6.250% Plain Vanilla Fixed Coupon Notes due March 1, 2039 (CUSIP ending "GQ4");
- $400 million of 6.350% Plain Vanilla Fixed Coupon Notes due February 15, 2038 (CUSIP ending "GM3");
- $950 million of 5.800% Plain Vanilla Fixed Coupon Notes due March 1, 2037 (CUSIP ending "GJ0");
- $3 billion of 6.050% Plain Vanilla Fixed Coupon Notes due March 1, 2034 (CUSIP ending "GE1");
- $300 million of 4.650% Plain Vanilla Fixed Coupon Notes due August 1, 2028 (CUSIP ending "JA6");
- $1,129,736,000 of 3.300% Plain Vanilla Fixed Coupon Notes due December 1, 2027 (CUSIP ending "HW0");
- $400 million of 3.300% Plain Vanilla Fixed Coupon Notes due March 15, 2027 (CUSIP ending "HS9");
- $600 million of 2.950% Plain Vanilla Fixed Coupon Notes due March 1, 2026 (CUSIP ending "HP5");
- $600 million of 3.500% Plain Vanilla Fixed Coupon Notes due June 15, 2025 (CUSIP ending "HM2");
- $350 million of 3.400% Plain Vanilla Fixed Coupon Notes due August 15, 2024 (CUSIP ending "HK6");

- $450 million of 3.750% Plain Vanilla Fixed Coupon Notes due February 15, 2024 (CUSIP ending "HG5");
- $300 million of 3.850% Plain Vanilla Fixed Coupon Notes due November 15, 2023 (CUSIP ending "HE0");
- $500 million of 4.250% Plain Vanilla Fixed Coupon Notes due August 1, 2023 (CUSIP ending "HZ3");
- $375 million of 3.250% Plain Vanilla Fixed Coupon Notes due June 15, 2023 (CUSIP ending "HC4");
- $400 million of 2.450% Plain Vanilla Fixed Coupon Notes due August 15, 2022 (CUSIP ending "HB6");
- $250 million of 3.250% Plain Vanilla Fixed Coupon Notes due September 15, 2021 (CUSIP ending "GW1");
- $300 million of 4.250% Plain Vanilla Fixed Coupon Notes due May 15, 2021 (CUSIP ending "GV3");
- $800 million of 3.500% Plain Vanilla Fixed Coupon Notes due October 1, 2020 (CUSIP ending "GT8");

85. For more detailed background information regarding the specific PG&E Notes at issue in this matter, *see* **Appendix C**.

86. The PG&E Notes are fixed interest securities. In other words, barring the Company exercising an option to repurchase the notes under certain terms, the holder of one of these PG&E Notes is entitled to specific interest payments on pre-specified dates and a return of the principal amount, or "par value" on the maturity date.

87. Like any security, the fair value of a corporate bond or note depends on the present value of expected future cash flows to the holder of that security discounted at the appropriate rate.[86] For example, each 4.000% Note had a par value of $1,000. This means that at maturity (December 1, 2046) the noteholder was scheduled to receive a payment of $1,000. Furthermore, the noteholder was entitled to receive interest payments of 4.000% per year ($40.00 per year), paid in semi-annual installments of $20.00 every six months. The market price of the note should reflect only the present value of these specific payments.

88. Therefore, even if a company performs extremely well and the stock price doubles, its corporate notes will never pay more than the contractually specified fixed cash amounts, and all else constant, the fair value of the notes would not be expected to rise substantially. On the other hand, notes are sensitive to the time value of money and default risk (*i.e.*, the risk of non-payment and/or partial payment). For this reason, the present value of a note will be influenced by firm-specific credit risk (*i.e.*, the probability of default and the expected recovery in case of default).[87] Likewise, negative events, including negative earnings, would not be expected to cause the Notes to decline substantially unless it impacted PG&E's perceived credit worthiness.

89. It is important to note that there is no expectation that all note securities issued by the same company will react in the same way or in the same magnitude to new information. For example, all else equal, a factor that pushes the note price down, such as an increase in credit

[86] Richard A. Brealey, et al. *Principles of Corporate Finance*, (10th ed.) McGraw Hill (2011), Chapter 3.

[87] In theory bond prices can also be influenced by other factors such as changes in tax treatment, the likelihood that the company would exercise early repayment, and the ability to sell the bond in a liquid market. For example, *see* Robert C. Merton, "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates," *The Journal of Finance* 29, (1974): pp. 449-470; Edwin J. Elton, Martin J. Gruber, Deepak Agrawal, and Christopher Mann, "Factors Affecting the Valuation of Corporate Bonds," *Journal of Banking and Finance* 28, (2004): pp. 2747-67; Merton H. Miller, "Debt and Taxes," *The Journal of Finance* 32, (1977): pp. 261-75; Merton H. Miller and Myron S. Scholes, "Dividends and Taxes," *Journal of Financial Economics*, (1978): pp. 333-64; Harry DeAngelo and Ronald W. Masulis, "Leverage and Dividend Irrelevancy under Corporate and Personal Taxation," *The Journal of Finance* 35, no. 2, (1980): pp. 453-464.

risk, would be expected to have a greater valuation impact on a longer maturity note than a shorter maturity note. Negative information that would lead an investor to seriously question the viability of a company over the next three years might have little influence on the value of a note that is scheduled to be repaid in a much shorter time period, for example, three months. In this same example, the subject information could have a profound impact on the value of a note that will be outstanding for the next ten years. Likewise, a change in market yields would affect the present value of a note with only three months until maturity less than the same change in yields for a note with ten years to maturity.

A. OVERVIEW OF SECONDARY MARKET FOR CORPORATE NOTES

90. Because the corporate note market is structured differently from stock exchanges, and lay people are generally not as familiar with the corporate note market, this section provides a brief overview of the secondary market for corporate notes. Currently the corporate note market is large and liquid. The total market value of outstanding corporate notes in the United States at the end of 2018 was approximately $8.5 trillion.[88]

91. Corporate notes, on average, trade less frequently than stocks. The fundamental value of a note is inherently less volatile and uncertain than the value of equity.[89] This is because a typical note is a relatively straightforward promise to pay contractual amounts of cash at particular points in time. In the absence of material changes in the credit risk of an issuer, changes in note values will thus be driven by changes in the time value of money (interest rates) rather than firm-specific information. Since interest rate information and pricing of similarly

[88] SIFMA "US Corporate Bond Statistics," available at http://www.sifma.org/research/statistics.aspx.

[89] This statement only applies to firms that are not considered to be in financial distress. For firms known to be in financial distress, the value of bonds fluctuates more and can be much more "equity-like."

rated instruments are widely available, there is less room for disagreement and speculation about fair value – and thus less incentive to trade. For these reasons, less trading in notes should not be mistaken for less efficient pricing.

92. While stocks typically trade on an exchange, corporate notes trade primarily over the counter ("OTC"). An over-the-counter market is one in which brokers/dealers maintain a market by expressing willingness to buy/sell at quoted bid/ask prices. Traditionally, OTC trades were conducted over the phone from broker-dealer trading desks where individual buy and sell negotiations were executed through the bid and ask prices. More recently, OTC trading has also incorporated electronic trading platforms that automatically match buy and sell orders. In 2024, as of the end of November, electronic trading accounted for 43% of total corporate note volume, as it provided (and continues to provide) efficient trading and services, price and volume transparency, and straight-through processing.[90]

93. In the past, pricing information for notes was difficult to obtain, as OTC trades were mostly conducted over the phone from broker-dealer trading desks and there was no mechanism for centralized reporting. However, with regulations that require trade reporting and the increased use of electronic trading platforms, dissemination of pricing information for notes has increased dramatically. This has made the note market more transparent.

94. In 1994, the National Association of Securities Dealers[91] (NASD, now known as FINRA)[92] commenced the Fixed Income Pricing System (FIPS) which was a mandated

[90] "December Spotlight: Corporate Bond Market Sees Liquidity Improve in Record Year," *Coalition Greenwich*, December 16, 2024.

[91] NASD was founded in 1939 in the wake of the 1938 Maloney Act amendments to the Securities Exchange Act of 1934. Refer to "The NASD – a unique experiment in cooperative regulation," *A.R.W*, December 1960.

[92] The Financial Industry Regulatory Authority (FINRA) is a non-governmental organization authorized by Congress to regulate the securities industry and protect investors. (*See also* http://www.finra.org/.)

regulatory reporting system for certain high yield corporate debt instruments. FIPS was started with the objective of establishing a centralized regulatory mechanism for note trade reporting.[93] In 2001, to further increase price transparency in the corporate debt market, the NASD established the Trade Reporting and Compliance Engine (TRACE). With the implementation of TRACE, all NASD and FINRA members are required to report prices, quantities, and all relevant information for transactions in corporate bonds covered by TRACE.[94] Today, in addition to TRACE, the greater use of electronic trading platforms such as MarketAxess,[95] BGC Partners,[96] GFI Group,[97] and Tradeweb[98] provides additional real-time corporate note price information.

95. The greater availability of trading data has allowed researchers to analyze the efficiency of the corporate note market in ways not possible in the past. Hotchkiss and Ronen (2002) used FIPS data to demonstrate that bond prices do not lag stock prices in reflecting new firm-specific information – even at an intraday level.[99] By examining price behavior around

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[93] Edith S. Hotchkiss and Tavy Ronen, "The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis," *The Review of Financial Studies* 15, no. 5, (2002).

[94] https://www.finra.org/filing-reporting/trace/faq; https://www.finra.org/filing-reporting/trace and Edith S. Hotchkiss and Tavy Ronen, "The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis," *The Review of Financial Studies* 15, no. 5, (2002). I note that the TRACE trade reporting requirements were in effect during the entire Class Period.

95 MarketAxess was formed in April 2000 by combining the efforts of Bear Stearns & Co. Inc., The Chase Manhattan Corp and J.P. Morgan & Co to offer fully disclosed electronic trading in U.S. high-grade Corporate Bonds, Eurobonds, Emerging Market bonds, high yield/crossover, credit default swaps (CDS) and U.S. agency securities.

[96] BGC was established in 1945 under the assumed name of Cantor Fitzgerald. In August 2004, Cantor Fitzgerald created BGC Partners by separating its voice brokerage business. BGC Partners commenced trading in October 2004.

[97] GFI Group was founded in 1987 in New York as the first broker of over-the-counter US government bond options. In 2007, the GFI EnergyMatch, a broker-assisted electronic energy trading platform, was launched in North America.

[98] Tradeweb Markets LLC was founded in 1996; it is the first multi-dealer online marketplace for U.S. Treasuries.

[99] Edith S. Hotchkiss and Tavy Ronen, "The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis," *The Review of Financial Studies* 15, no. 5, (2002): p. 1326.

earnings releases, Hotchkiss and Ronen found that information is quickly incorporated into both bond and stock prices, even at short return horizons. Their study relies on a dataset based on daily and hourly transactions for 55 high-yield bonds between January and October 1995 and shows that "the informational efficiency of corporate bond prices is similar to that of the underlying stocks," and that "stocks do not lead bonds in reflecting firm-specific information."[100]

B. OVERVIEW OF EFFICIENCY FACTORS

96. I now turn to an evaluation of each of the efficiency factors for the relevant PG&E Notes. In summary, and as discussed more fully below, my analysis supports that the markets for PG&E Notes were efficient during the Class Period. *First*, the average weekly trading volume of the Notes during the Class Period varied from Note to Note, but all fell within the range of the bonds in the Hotchkiss and Ronen study, and some exceeded benchmarks that courts have established.[101] *Second*, there were a large number of securities analysts following and reporting on the Company. *Third*, the Notes were actively traded in OTC markets. *Fourth*, PG&E was S-3 eligible. *Fifth*, the relevant PG&E Notes had a large market capitalization compared to other corporate bonds. *Sixth*, the PG&E Notes had bid-ask spreads comparable to other corporate notes and fell within the range of bid-ask spreads for common stocks trading on major exchanges. *Seventh*, institutions, which are generally considered to be well-informed investors, held, on average, at least 48% of the outstanding PG&E Notes.[102] *Eighth*, even though some notes exhibited autocorrelation, I determined the magnitude is economically immaterial

[100] Edith S. Hotchkiss and Tavy Ronen, "The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis," *The Review of Financial Studies* 15, no. 5, (2002): p. 1325.

[101] The average weekly turnover of PG&E Notes (1.13%) was smaller than the average U.S. corporate bond (1.85%), but not by orders of magnitude. (*See* SIFMA "US Corporate Bond Statistics," available at http://www.sifma.org/research/statistics.aspx).

[102] This varied from Note to Note with a range of 2.5% to 70.3%.

and too small to reflect an arbitrage opportunity. *And finally*, I demonstrate that there was a strong cause-and-effect relationship between new Company-specific information and the market price of the Notes during the Class Period. My analysis of these factors in total all support the conclusion that the PG&E Notes traded in open, developed, and efficient markets throughout the Class Period. **Exhibit 16** provides an overview of how, for each of the factors examined, the empirical evidence supports the finding that PG&E Notes traded in efficient markets.

C. *CAMMER* FACTOR 1: AVERAGE WEEKLY TRADING VOLUME

97. In order to compute the average weekly trading volume for the PG&E Notes, I used data from FINRA's (formerly the NASD) electronic quotation and surveillance system for over-the-counter secondary market transactions of eligible fixed income securities, TRACE, as provided by Eikon.[103] It should be noted that the publicly reported trading volume for corporate notes likely understates the actual volume. This is because in its publicly reported data, FINRA truncates the size of large trades to protect the identity and confidentiality of traders. Therefore, the figures reported herein likely understate the true trading volume.[104]

98. The average weekly turnover for the PG&E Notes varies substantially from note to note and ranges from 0.26% to 4.91%, as shown on **Exhibit 17**, which compares the average weekly trading volume of each PG&E Note with the bonds from the Hotchkiss and Ronen study

[103] "The Trade Reporting and Compliance Engine is the FINRA developed vehicle that facilitates the mandatory reporting of over-the-counter secondary market transactions in eligible fixed income securities. All broker/dealers who are FINRA member firms have an obligation to report transactions in corporate bonds to TRACE under an SEC approved set of rules." (*See* https://www.finra.org/filing-reporting/trace). I understand that the TRACE data I obtained from Eikon has been cleaned.

[104] I understand that Plaintiffs have subpoenaed FINRA for full trading volume. If that data is obtained and I am asked to update my analysis, then I am prepared to do so.

that concluded the markets for those bonds were efficient.[105,106] Again, that study found that corporate bond prices do not trail stock prices in how quickly they react to newly released information – suggesting that corporate bonds do not trade less efficiently than their corresponding common stocks. The fact that the trading volume of the PG&E Notes was not dissimilar from the bonds used in the Hotchkiss and Ronen study lends additional confidence that there was sufficient trading of these Notes to support an efficient market for each of them.

99. According to the *Cammer* court, an average weekly turnover of greater than 1% "would justify a substantial presumption" that a market was efficient. As shown on **Exhibit 17**, 10 of the 29 PG&E Notes had average weekly trading volume that exceeded this threshold. Furthermore, as shown in **Appendix D**, for all the PG&E Notes, even those with less than 1% average trading volume, there were numerous weeks when the trading exceeded the 1% threshold or much higher.

100. As discussed above, corporate notes typically do not trade as frequently as common stock. Moreover, given the risk-return payoffs of corporate notes and the structure of the corporate note market, it is not uncommon for corporate notes to trade far less frequently than every day.[107] A study by Sriketan Mahanti, et al. (the "Mahanti Paper"), which used the State Street Corporation custody-trades database, showed that the vast majority of notes in their data traded less than 30 days out of the 250 trading days per year (*see* **Exhibit 18**).[108]

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[105] For the purposes of this analysis, a "trading week" consists of 5 consecutive trading days (this may not follow the calendar week). "Trading weeks" less than 5 consecutive trading days were excluded from my analysis. The median average weekly turnover for all PG&E Notes was approximately 0.70%.

[106] Volume reporting for the Notes is likely understated. This is because, to my understanding, FINRA often releases truncated volume data to protect the anonymity of traders.

[107] Sriketan Mahanti, et al. "Latent Liquidity: A New Measure of Liquidity, with Application to Corporate Bonds," *Journal of Financial Economics* 88, (2008): pp. 272-298.

[108] *Id*.

101. **Exhibit 18** also shows that each of the PG&E Notes traded much more frequently and fall within the top of the distribution of corporate notes from the State Street database in terms of how many days per year they trade. Likewise, **Exhibit 19** compares the average number of days between trades for the corporate notes in the Mahatani Paper and for the PG&E Notes. On average, the PG&E Notes have much less time between successive trades than the notes from that study.

102. In my view, the evidence of active trading of the PG&E Notes is supportive of the efficiency of the market for each of the Notes.

D. *CAMMER* FACTOR 2: ANALYST COVERAGE

103. As previously discussed in this report, equity analysts issued many reports on PG&E throughout the Class Period (*see* **Exhibit 5**). The information in these equity reports (*i.e.*, stock price targets, purchase recommendations, earnings forecasts, and valuation models) would also be of interest to PG&E Note holders as these reports discussed the overall financial health of the Company.

104. In my view, the fact that there was analyst coverage of PG&E Securities throughout the Class Period is supportive of a finding of market efficiency with respect to the Notes.

E. *CAMMER* FACTOR 3: MARKET MAKERS

105. The third *Cammer* factor covers market makers. I do not currently have data to directly assess the number of market makers for each PG&E Note during the Class Period. Given the active trading in PG&E Notes documented above, I would be extremely surprised to find that there were a very small number of market makers. As stated above, I understand Counsel for Plaintiffs has issued a subpoena to FINRA to obtain detailed data that would allow

me to identify market makers for each PG&E Note. If that data is obtained and I am asked to update my findings, I am prepared to do so.

F. *CAMMER* FACTOR 4: SEC FORM S-3 ELIGIBILITY

106. As discussed in **Section VII**, related to PG&E Common Stock, PG&E complied with all of the requirements for a company to be S-3 eligible and filed a Form S-3 during the Class Period. Therefore, PG&E Notes meet this *Cammer* efficiency factor, which supports the conclusion that the PG&E Notes traded in efficient markets.

G. *CAMMER* FACTOR 5: PRICE REACTION TO NEW INFORMATION

107. Like for PG&E Common Stock, my overall approach to assessing cause and effect is to evaluate whether there is evidence that PG&E Notes were more likely to exhibit (1) a statistically significant response, (2) larger average price movements, and (3) greater volume on a set of days with important news versus a set of "least news" days. As discussed above, even for PG&E Common Stock, earnings announcements would often not be expected to move the stock price significantly for a public utility company that is subject to rate of return regulation. This issue is even more acute for PG&E Notes since note prices would only be expected to change in value in response to events that change the perceived credit-worthiness of the Company. In other words, absent an event large enough to change the market's perception of PG&E's solvency or overall riskiness to pay its debts, one would not expect to see large firm-specific movements in the PG&E Notes.

108. Therefore, starting from the conclusion that PG&E Common Stock traded efficiently, I tested how the market price of PG&E Notes responded to the ten days on which PG&E Common Stock exhibited the largest abnormal price movements according to my event study ("Top Ten Days"). So long as there is important firm-specific news on each of these days

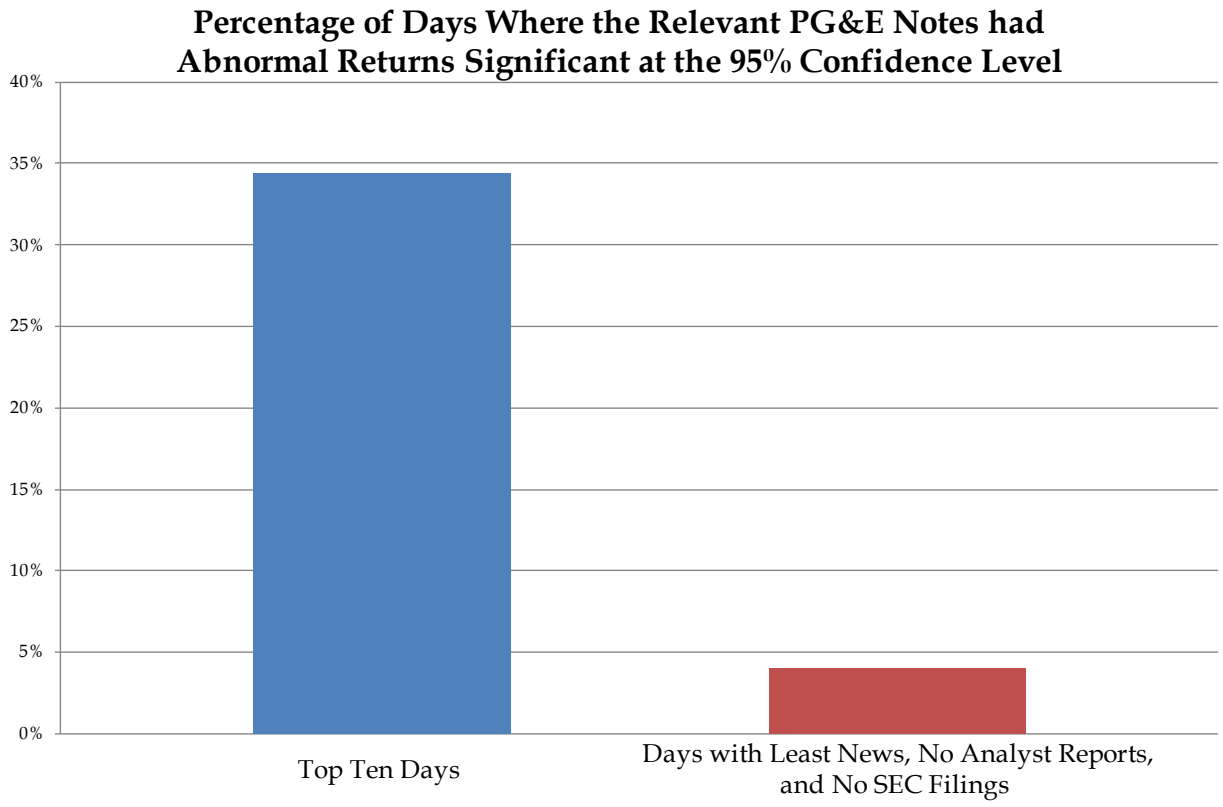
(which there was), this represents a set of events for which the value of PG&E is changing enough to potentially impact the market's assessment of PG&E's creditworthiness and from which I could scientifically test for a cause and effect relationship between new news and changes in the market prices of PG&E Notes.

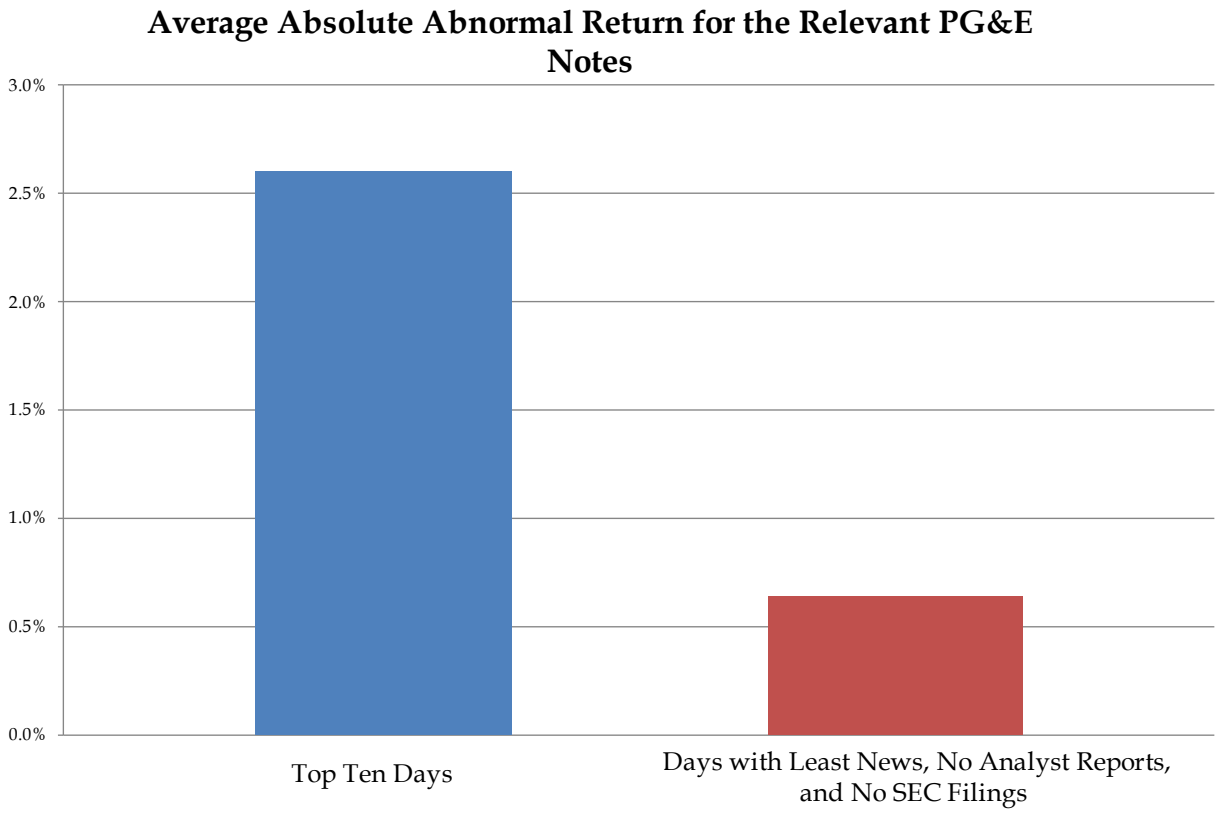
109. **Exhibit 21** provides a list of these ten days and summarizes at least some of the important news that occurred on those days. To analyze whether PG&E Notes responded to these news events, I conducted an event study which controlled for a bond market index (ICE BofA US Corporate Total Return Index). Like for the Common Stock, I separated the Class Period into the period before October 18, 2017 (after the first series of alleged corrective disclosures when the market learned information about PG&E's liability for the North Bay Fires) and from that point to the beginning of the Camp Fire (November 7, 2018). Over each of those periods I ran a fixed regression model to evaluate the relationship between the bond index and each PG&E Note.[109] The results of the regression models are summarized in **Exhibit 20**.

110. Then, as for the Common Stock, I use these models to evaluate whether there is evidence that the abnormal returns for PG&E Notes on the Top Ten Days are more likely to exhibit statistical significance and be larger than the price movements on the days with the least amount of PG&E news. **Exhibit 22** presents the results of these tests for PG&E Notes. Across the 29 PG&E Notes I am evaluating, there were 192 observations where I could assess the market price reaction of a PG&E Note to a Top Ten Day event (the total number of observations is less than 290 because many of the PG&E Notes were issued after some of the Top Ten Day

[109] There are some trading days in which there were no reported trades for PG&E Notes. When conducting the market model regression for the Notes, I only rely upon data where I have prices on contiguous days. This allows for a proper estimate of the single-day standard deviation of the errors. I then use this single-day standard deviation to evaluate statistical significance on each day (and appropriately adjust the threshold of significance for returns that are measured over multiple days – *see* discussion at ¶ 56 above for an explanation of the standard deviation of the errors).

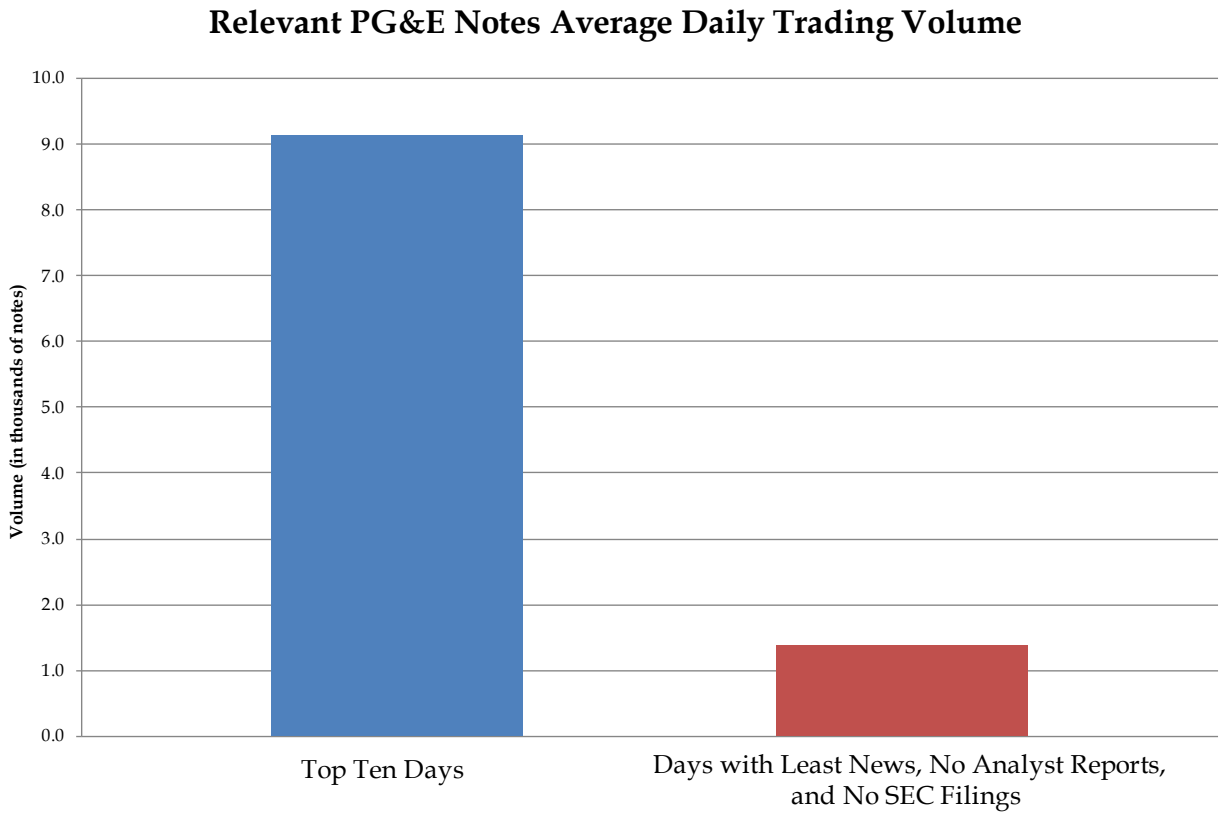
events occurred or there was not a reported price on the date of interest). Of these 192 observations, 34% showed a statistically significant price response. Compare this to the 771 observations where I am able to measure the abnormal return of a PG&E Note on a day where there is little PG&E news. For that sample, only 4% of the PG&E Note returns are statistically significant. This difference between 34% and 4% is highly statistically significant (beyond 99% confidence) and represents strong scientific evidence of a cause-and-effect relationship between firm-specific news and changes in the market price of PG&E Notes. There is also a statistically significant difference at the 99% confidence level between the average absolute abnormal return on the Top Ten Days and "least news" days. The bar charts below summarize this analysis.





111. Finally, when important firm-specific news is released to the market, as evidenced by large PG&E Common Stock abnormal returns, the daily trading volume also tends to be much higher than on days where there is a low amount of news. For instance, the average daily trading volume of PG&E Notes on the combined 192 Top Ten Days was 9,132 notes. Compare this to the average daily trading volume of 1,372 notes for the days with least news in the Class Period.[110] The bar chart below summarizes this analysis.

[110] This difference between 9,132 and 1,372 notes is itself statistically significant at the 99% confidence level using a Chi-square test.



112. In my view, the event studies for the PG&E Notes are highly supportive of efficient markets. They provide scientific evidence of rapid market price responses of the PG&E Notes to new news.

H. *KROGMAN* FACTOR 1: MARKET CAPITALIZATION

113. The average and median size of the bonds included in the Hotchkiss and Ronen study are $380 million and $300 million, respectively (*see* **Exhibit 17**). The PG&E Notes, on average, had issue sizes much larger than the average and median issue size for bonds analyzed in this study. **Exhibit 23** shows the market capitalization of each of the PG&E Notes, which ranged between $257 million and $3.71 billion during the Class Period, with an average across the PG&E Notes of $647 million.

114. In my view, the market capitalization for the PG&E Notes is supportive of efficiency.

I. *KROGMAN* FACTOR 2: THE BID-ASK SPREAD

115. As discussed above in **Section VII.H**, the size of the bid-ask spread in the market is an indication of the liquidity in the market and is sometimes considered a factor in determining whether the security trades in an efficient market. In *Krogman*, the court suggested, "A large bid-ask spread is indicative of an inefficient market, because it suggests that the stock is too expensive to trade."[111]

116. In corporate bond markets, there are no centrally reported bid-ask spreads. Instead, I employed a technique used by researchers in finance whereby I calculated the percent spread by taking the difference between the bid price and the ask price on a given day and dividing by the average bid and ask price.[112] To make these calculations, I used a dataset compiled by Bloomberg that includes the last bid and ask prices on any given date.[113]

117. The results in **Exhibit 24** show that the average bid-ask spread is between 0.30% and 2.05% for the PG&E Notes. The median bid-ask spread is between 0.28% and 2.06%. The bid-ask spread is comparable to spreads for similar securities according to academic research.[114] Furthermore, the bid-ask spreads of the PG&E Notes do not fall outside the range of bid-ask spreads for the random sample of 100 **common stocks** I analyzed above. In particular, the bid-

[111] *Krogman*, 202 F.R.D. at 478.

[112] *See*, for instance, Paul Schultz, "Corporate Bond Trading Costs: A Peek Behind the Curtain," *The Journal of Finance* 56, (2001): pp. 677-698, who uses a regression analysis to estimate the bid-ask spread.

[113] If a bid and ask price are unavailable, Bloomberg uses the last available price, so I have excluded days where the bid and ask prices are equal, to be conservative.

[114] *See*, for example, Table 6, panel C in Michael A. Goldstein, Edith S. Hotchkiss and Erik R. Sirri, "Transparency and Liquidity: A Controlled Experiment on Corporate Bonds," *The Review of Financial Studies* 20, no. 2, (2007): pp. 235-273. A bid-ask spread of just above one percent is relatively narrow.

ask spread for the PG&E Notes fall between the 61st percentile to the 91st percentile of a randomly selected group of 100 common stocks shows that all PG&E Notes are therefore within the range of the bid-ask spread of random common stock traded on major exchanges.

118. Given that the bid-ask spreads for PG&E Notes are not abnormally large even when compared to exchange traded common stocks, this provides supportive evidence of efficient markets for the PG&E Notes.

J. ADDITIONAL FACTOR: INSTITUTIONAL OWNERSHIP AND PG&E NOTES OUTSTANDING

119. **Exhibit 25** summarizes the percentage of the PG&E Notes that were held by institutions during the quarter ending September 30, 2018 (which was during the Class Period), ranging from 2.5% to 70.3%, with an average of 48.2%.[115] This suggests that a substantial portion of the PG&E Notes were held by sophisticated, well-informed investors. This factor therefore supports a finding that the PG&E Notes traded in efficient markets.

K. ADDITIONAL FACTOR: AUTOCORRELATION

120. In line with what I did for PG&E Common Stock, I tested for autocorrelation in the returns of the PG&E Notes by evaluating whether the prior day price change is predictive of the price change on the next day. More specifically, I run a regression where the dependent variable is the percentage change in the bid price of the PG&E Note on day t and the independent variable is the percentage change in the bid price of the PG&E Note on day t-1.[116] I then do the same using the ask prices. The results are summarized for the Class Period in **Exhibit 26**.

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[115] The percentage of shares held by institutions is a lower bound estimate because the reported number of notes held by institutions only reflects public information available to Bloomberg.

[116] I use bid and ask prices separately because of the "bid-ask bounce" phenomenon when analyzing note prices. Since note prices tend to be far less volatile than stock prices, running autocorrelation tests on transaction prices for notes often find apparent negative autocorrelation that is caused simply by which side initiates a trade. For example, assume the bid-ask spread for a note is $99 and $101. In other words, one who wishes to buy can trade immediately at the ask price of $101 and one who wishes to sell immediately can execute a trade for $99. Even if the market

121. The results show that there is statistically significant autocorrelation for some PG&E Notes (sometimes positive, sometimes negative), but the autocorrelation is not economically meaningful. Autocorrelation is only evidence of market inefficiency if it presents an obvious arbitrage opportunity. But here, the potential arbitrage opportunity is tiny. **Exhibit 27** uses the autocorrelation coefficients from **Exhibit 26** and the average size of the price movement for each note to measure the daily profit one could earn from trying to exploit autocorrelation. **Exhibit 27** shows that this average benefit is smaller than the bid-ask spread for each of the Relevant Notes, when using either the bid prices or the ask prices.[117]

122. As a result, there is no evidence of exploitable autocorrelation that would call into question the efficiency of the market for PG&E Notes. Therefore, this factor also supports the conclusion that the PG&E Notes traded in efficient markets throughout the Class Period.

L. CONCLUSION

123. In summary, every factor analyzed supports my opinion that the PG&E Notes traded in efficient markets.

price is not really moving (the midpoint between the bid and the ask remains constant at $100), when comparing trade prices, successive days will either show no change – (i.e. it will be consistent with the prior trade) or it will be the reverse of the prior change (i.e. if it moved from $99 to $101 on one trade, it would either not change or move back to $99 on the next trade). The reported prices will therefore be negatively autocorrelated even though there is no change in market valuation. This is typically not an issue with common stock because the changes in market value on a daily basis are much larger than the bid-ask spread. Using the bid prices or the ask prices independently removes this effect.

[117] The average benefit of arbitrage is calculated by multiplying the absolute value (magnitude) of the autocorrelation coefficient shown on **Exhibit 28** for a given note, by the average magnitude of the bid or ask price returns for that note during the Class Period.

IX. APPLICATION OF CERTAIN EFFICIENCY FACTORS TO PG&E PREFERRED SECURITIES

A. OVERVIEW OF PG&E PREFERRED SECURITIES AND EFFICIENCY FACTORS

124. I begin by describing preferred stock in general, and then proceed to describe PG&E Preferred Securities which I specifically analyze in this case. In general, "preferred stock" refers to securities which bear resemblance to both equity and debt. The exact terms for preferred stock can vary substantially for each issue.[118] Preferred stocks often receive a coupon payment like a bond, but may have a very long or perpetual maturity. They typically rank junior to debt (*i.e.*, debt-holders would be repaid in a liquidation before preferred shareholders), but senior to common equity. Companies may also issue multiple classes (also called "series") of preferred stock, which can be ranked by seniority in relation to one another.[119] Preferred stock also often receive preferential treatment when it comes to dividends (*e.g.,* preferred share coupon payments often must be made before any dividends can be paid to common shareholders).[120] In many cases, preferred stock issuances are callable, meaning the issuing company has the option to purchase back preferred shares at a predetermined price at their discretion.[121] In addition, preferred stock can often be converted to common stock. Sometimes this option is held by the investor and other times by the issuer. In addition, preferred stock represents ownership in the company, but owners of preferred stock do not usually have voting rights.[122]

[118] For example, see the discussion in William Sharpe, et al., Investments, (5th ed.) Prentice Hall (1995), p. 420.

[119] *Id*.

[120] *Id*.

[121] *Id*.

[122] Richard A. Brealey, et al. *Principles of Corporate Finance*, (10th ed.) McGraw Hill (2011), pp. 350-351.

125. Certain investors might find preferred stock more attractive relative to common stock for a variety of reasons. For example, it may offer regular cash flows that are not as sensitive to company performance as dividends on common stock, and institutions may find preferred stock particularly attractive because of favorable rules governing dividends. Also, it is typically a safer investment vehicle because in the event of a company's liquidation, preferred stockholders enjoy priority distribution of the company's assets over the common shareholders.[123]

126. I have been asked to analyze the PG&E Preferred Securities at issue, listed below:

- PG&E 6.00% Series A Cumulative Preferred Stock
- PG&E 5.50% Series B Cumulative Preferred Stock
- PG&E 5.00% Series C Cumulative Preferred Stock
- PG&E 5.00% Series D Cumulative Preferred Stock
- PG&E 5.00% Series E Cumulative Preferred Stock
- PG&E 4.80% Series G Cumulative Preferred Stock
- PG&E 4.50% Series H Cumulative Preferred Stock
- PG&E 4.36% Series I Cumulative Preferred Stock

127. After giving careful consideration to each of the efficiency factors described in detail below, I find that each factor supports the conclusion that the markets for PG&E Preferred Securities were efficient throughout the Class Period.

128. As further background to my analysis, **Exhibit 28-1** through **Exhibit 28-8** displays the closing price and trading volume for each day throughout the Class Period for PG&E

[123] Frank Reilly, and Keith Brown, *Investment Analysis and Portfolio Management*, (6th ed.) The Dryden Press, (2000), p. 82; Richard A. Brealey, and Stewart C. Myers, *Principles of Corporate Finance*, (3rd ed.) McGraw-Hill, (1988), pp. 308-309.

Preferred Securities, respectively. **Exhibit 1** provides background information and details on the terms of PG&E Preferred Securities.

129. In summary, and as discussed more fully below, PG&E Preferred Securities traded in efficient markets during the Class Period. *First*, for six of the eight PG&E Preferred Securities, the average weekly trading volume exceeded the 1% Cammer threshold that justifies a "substantial presumption" of market efficiency. *Second*, as already discussed, there was substantial analyst coverage of PG&E. *Third*, the PG&E Preferred Securities traded on a major stock exchange (the NYSE American Exchange)[124] and therefore satisfies the market maker factor. *Fourth*, PG&E was S-3 eligible. *Fifth*, I find a strong cause-and-effect relationship between new Company-specific information and changes in the market price of PG&E Preferred Securities during the Class Period. *Sixth*, two of the PG&E Preferred Securities had large market capitalizations relative to all other common stock that traded on the NYSE and NASDAQ. *Seventh*, PG&E Preferred Securities had bid-ask spreads that fell within the range observed for common stocks trading on major exchanges. *Eighth*, while there is evidence of consistent autocorrelation during the Class Period, I determined that the magnitude is economically immaterial and too small to reflect an arbitrage opportunity. Based on my analysis of these factors, I conclude that PG&E Preferred Securities traded in open, developed, and efficient markets throughout the Class Period.

[124] *See* https://investor.pgecorp.com/shareholders/Frequently-Asked-Questions/default.aspx; https://www.nyse.com/markets/nyse-american/market-info.

B. *CAMMER* FACTOR 1: AVERAGE WEEKLY TRADING VOLUME

130. **Exhibit 29** summarizes the PG&E Preferred Securities average weekly trading volume as a fraction of shares outstanding during the Class Period.[125] For six of the eight PG&E Preferred Securities, the average weekly trading volume is above the 1% threshold cited by *Cammer* as a threshold for a "substantial presumption" of market efficiency.

131. Moreover, after the first alleged corrective disclosure, there was greater variability of the prices for PG&E Preferred Securities and greater trading. Indeed, after the first corrective disclosure, all except two of the PG&E Preferred Securities had an average weekly trading volume over the 1% Cammer threshold for a "substantial presumption," and three of the PG&E Preferred Securities had an average weekly trading volume over 2%. Furthermore, the prices of Series A and Series E (the two PG&E Preferred Securities that had less than 1% average weekly trading volume over the entire period) tracked closely with the other PG&E Preferred Securities (*see* **Exhibit 30**).

132. In sum, there was substantial trading of PG&E Preferred Securities during the Class Period and this factor supports that they traded efficiently.

C. *CAMMER* FACTOR 2: ANALYST COVERAGE

133. As previously discussed in this report, equity analysts issued many reports on PG&E throughout the Class Period (*see* **Exhibit 5**). The information in these equity reports (*i.e.*, stock price targets, purchase recommendations, earnings forecasts, and valuation models) would also be of interest to holders of PG&E Preferred Securities as these reports discussed the overall financial health of the Company.

[125] **Appendix E** contains the weekly trading volume as a fraction of shares outstanding and public float for each week during the Class Period for the PG&E Preferred Securities.

134. In my view, the fact that there was analyst coverage of PG&E Securities throughout the Class Period is supportive of a finding of market efficiency with respect to the Preferred Securities.

D. *CAMMER* FACTOR 3: MARKET MAKERS

135. PG&E Preferred Securities traded on the NYSE American Market (formerly the American Stock Exchange). All of this exchange's securities trade in a fully electronic manner, with similarities to the NYSE.[126] Given that the PG&E Preferred Securities traded on a major exchange which essentially guarantees liquidity, this factor is supportive of the conclusion that the PG&E Preferred Securities traded in efficient markets.

E. *CAMMER* FACTOR 4: SEC FORM S-3 ELIGIBILITY

136. As discussed in **Section VII**, related to PG&E Common Stock, PG&E complied with all of the requirements for a company to be S-3 eligible and filed a Form S-3 during the Class Period. Therefore, PG&E Preferred Securities meet this *Cammer* efficiency factor, which supports the conclusion that the PG&E Preferred Securities traded in efficient markets.

F. *CAMMER* FACTOR 5: PRICE REACTION TO NEW INFORMATION

137. As I did for the PG&E Notes, and for the same reasons as described in that section, I analyze cause and effect for PG&E Preferred Securities by comparing the price reactions of the PG&E Preferred Securities on the "Top Ten Days" versus the "least news days." I performed a regression analysis where I tested whether either of the factors I controlled for in my event study for PG&E Common Stock (*i.e.*, the S&P 500 Total Return Index and the Peer Index) were predictive of returns for PG&E Preferred Securities. [127] Neither of these variables provided any

[126] *See* https://www.nyse.com/markets/nyse-american.

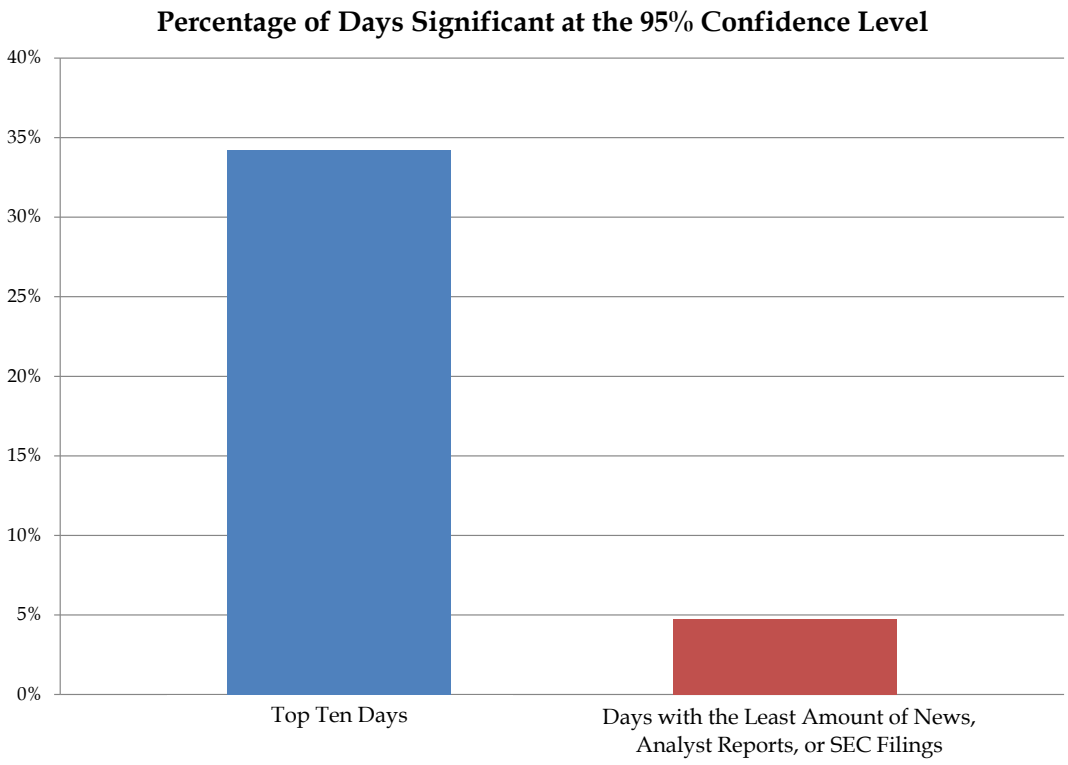
[127] There are some trading days in which there were no reported trades for PG&E Preferred Securities. When conducting the market model regression for the Preferred Securities, I only rely upon data where I have prices on

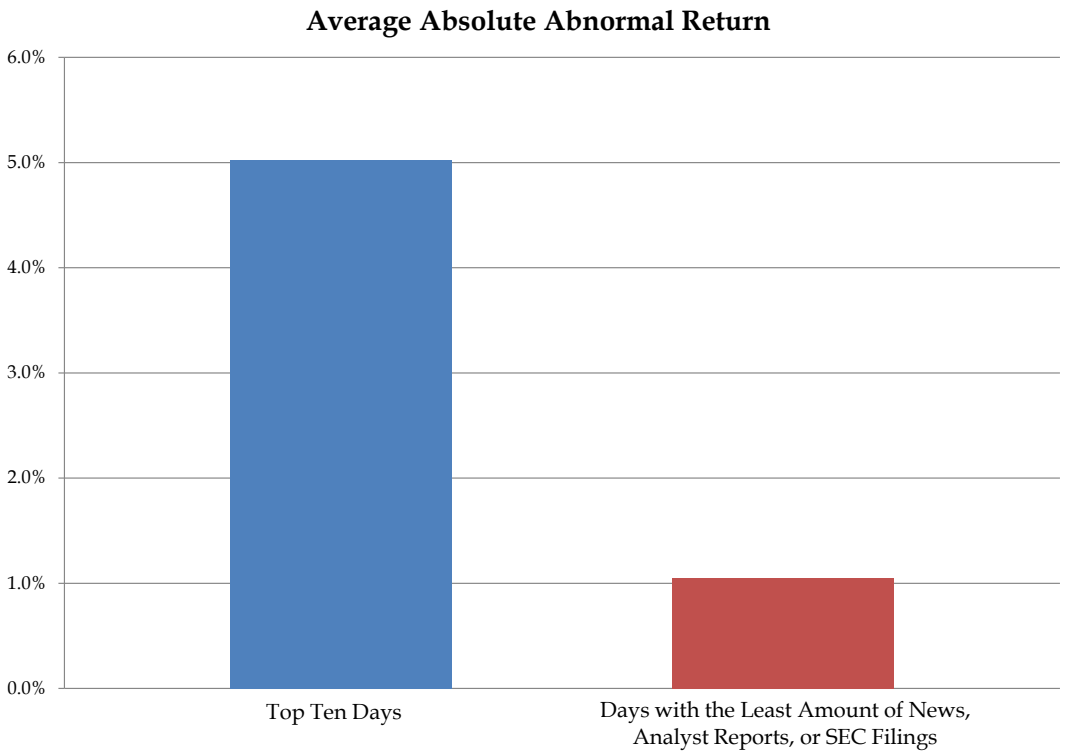
predictive power. I also performed a regression analysis where I tested whether the factor I controlled for in my PG&E Notes event study (the ICE BofA US Corporate Total Return Index) was predictive of returns for PG&E Preferred Securities and found no consistent relationship or any meaningful predictive power. I find that controlling for any of these variables simply adds noise to the estimates of the abnormal returns and I therefore run the regression model with a simple intercept term.[128]

138. **Exhibit 31** shows that there was a statistically significant market price change at the 95% significance level on 26 of the 76, or 34.21%, of the combined Top Ten Days. As shown on **Exhibit 31**, there were only 17 statistically significant returns for all 8 preferred securities on 357 "least news" days (or 4.76%). Thus, the data are entirely consistent with a cause-and-effect relationship. The observed difference between 34.21% and 4.76% is statistically significant at the 99% significance level using a Chi-square test (*see* **Exhibit 31**). There is also a statistically significant difference at the 99% confidence level between the average absolute abnormal return on the Top Ten Days and "least news" days. The average absolute abnormal return for the Top Ten Days is 5.02% and 1.05% on "least news" days (*see* **Exhibit 31**). The bar charts below summarize this analysis.

contiguous days. This allows for a proper estimate of the single-day standard deviation of the errors. I then use this single-day standard deviation to evaluate statistical significance on each day (and appropriately adjust the threshold of significance for returns that are measured over multiple days – *see* discussion at ¶ 56 above for an explanation of the standard deviation of the errors).

[128] Like for PG&E Notes, I estimate the regression over two fixed periods. I separated the Class Period into the period before October 18, 2017 (after the first series of alleged corrective disclosures when the market learned information about PG&E's liability for the North Bay Fires) and from that point to the beginning of the Camp Fire (November 7, 2018).

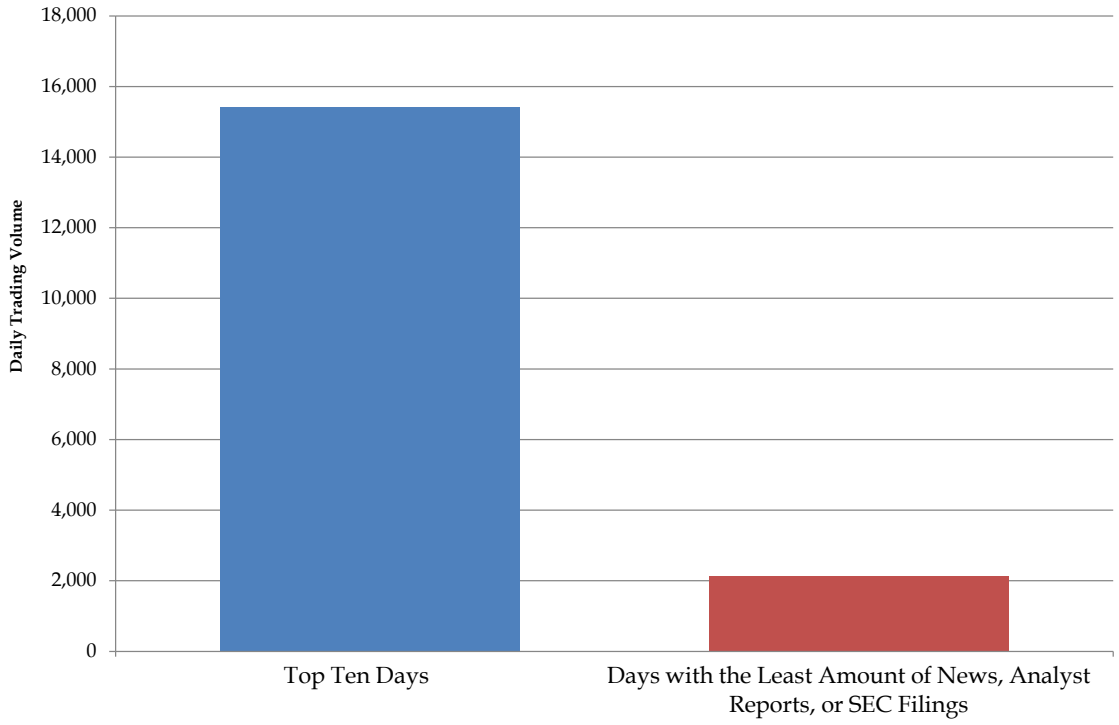




139. The bar charts above establish a strong cause-and-effect relationship between new, unexpected news and rapid price changes in PG&E Preferred Securities. The Top Ten Days have a greater percentage of significant price movements and statistically significantly larger price changes than those found on least news days.

140. Finally, the average daily trading volume of PG&E Preferred Securities on the combined 76 Top Ten Days was 15,413 shares. Compare this to the average daily trading volume of 2,145 shares for the days with least news during the Class Period. The bar chart below summarizes this analysis.

Average Daily Trading Volume



141. In conclusion, the event study analysis presented in this section demonstrates a clear cause-and-effect relationship between new company specific news and changes in the market price of PG&E Preferred Securities.

G. *KROGMAN* FACTOR 1: MARKET CAPITALIZATION

142. **Exhibit 32** shows that during the Class Period, Preferred Stock Series A and Series E had a market capitalization of over $100 million – putting them in the 18th to 35th percentile even when compared against common stock market capitalization – and did not have unusually low market capitalization during the Class Period, which is supportive of market efficiency. While the other Preferred Securities had smaller market capitalizations, the high correlation in price movements amongst all of the Preferred Securities is highly suggestive that all eight series traded in efficient markets. In my view, the market capitalization for the PG&E Preferred Securities is supportive of an efficiency finding.

H. *KROGMAN* FACTOR 2: THE BID-ASK SPREAD

143. As **Exhibit 33** shows, during this period, the average time-weighted average percentage bid-ask spread for PG&E Preferred Securities in was between 1.66% and 3.43%.[129] The median bid-ask spread is between 1.46% and 3.06%. These bid-ask spreads are within the range of bid-ask spreads I find when compared to 100 random common stocks (which ranged from 0.02% to 6.78%). Therefore, PG&E Preferred Securities did not have abnormally large bid-ask spreads that fall outside of the range of what is observed from common stocks trading on the major exchanges and, supports my conclusion that PG&E Preferred Securities traded in efficient markets throughout the Class Period.

[129] The range of bid-ask spread from the 89th percentile to the 95th percentile of a randomly selected group of 100 common stocks shows that all PG&E Preferred Securities are therefore within the range of the bid-ask spread of random common stock traded on major exchanges.

I. ADDITIONAL FACTOR: INSTITUTIONAL OWNERSHIP AND PG&E PREFERRED SECURITIES SHARES OUTSTANDING

144. I have limited information regarding the institutional holding of PG&E Preferred Stock. **Exhibit 34** summarizes the percentage of the PG&E Preferred Securities that were held by institutions during the quarter ending September 30, 2018 (which was during the Class Period), ranging from 13.4% to 0.3%, with an average of 6.1%. This suggests that a portion of the PG&E Preferred Securities were held by sophisticated, well-informed investors. I note that this is a lower bound estimate of the actual numbers, as this reported number only reflects public information available to Bloomberg.

J. ADDITIONAL FACTOR: AUTOCORRELATION

145. Similar to PG&E Common Stock and Notes, I tested the autocorrelation of PG&E Preferred Securities using bid and ask prices. **Exhibit 35** shows the coefficients and the associated t-statistics for the regressions of PG&E Preferred Securities. Again, while the tests show significant autocorrelation, a further analysis of whether these observed correlations represent an actual arbitrage opportunity demonstrate that they do not. **Exhibit 36** uses the average magnitude of price changes and the autocorrelation coefficients to show that the economic benefit from trying to arbitrage such autocorrelation falls within the bid-ask spread and therefore would be swamped by transactions costs. In other words, the observed autocorrelation is not economically meaningful and this factor supports that PG&E Preferred Securities traded in efficient markets.

K. CONCLUSION

146. Based upon my evaluation of the factors above, I conclude that the PG&E Preferred Securities traded in efficient markets.

X. DAMAGES

147. Counsel for the Lead Plaintiff also asked me to opine on whether per share damages could be measured for all purchasers of PG&E Securities during the Class Period under Section 10(b) of the Exchange Act using a common methodology that is consistent with the Lead Plaintiff's theory of liability.[130] There is a standard and well-accepted method for calculating class wide damages in cases under Section 10(b) of the Exchange Act. This method, typically referred to as the "out-of-pocket" method, states that damages are equal to the artificial inflation in the share price at the time of purchase minus the artificial inflation per share at the time of sale (or, if the share is not sold before full revelation of the fraud, the artificial inflation at the time of purchase, subject to the Private Securities Litigation Reform Act of 1995's ("PSLRA") "90-day lookback" provision, a formulaic limit on damages that also can be applied class-wide).[131] The out-of-pocket method has been applied in virtually every matter in which I have observed or participated in as a consulting, testifying, or neutral expert.

148. Once the inflation per share (or per Note for PG&E Notes) has been quantified on each day during the class period, the computation of damages for each class member is formulaic based upon information collected in the claims process (*i.e.*, the investor's purchase and sale history for the security, which is routinely available from brokerage statements and/or other documents that provide evidence of securities transactions). Therefore, there is a well-accepted method to compute damages in Section 10(b) matters such as this.

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[130] *See* **Section III** and **Section IV**.

[131] Specifically, the PSLRA states: "…in any private action arising under this title in which the plaintiff seeks to establish damages by reference to the market price of a security, the award of damages to the plaintiff shall not exceed the difference between the purchase or sale price paid or received, as appropriate, by the plaintiff for the subject security and the mean trading price of that security during the 90-day period beginning on the date on which the information correcting the misstatement or omission that is the basis for the action is disseminated to the market." *See* Private Securities Litigation Reform Act of 1995, dated December 22, 1995, 737, 748-49.

149. Separate and apart from whether there is a common method for computing damages is the question of how to quantify the artificial inflation per share that is an input to the damages methodology. The quantification of the artificial inflation per share requires a detailed loss causation analysis.[132] Nevertheless, whatever the method for determining the artificial inflation per share, it would be common to all class members.

150. For example, the most widely-used technique to quantify artificial inflation starts from an event study that measures price reactions to disclosures that revealed the relevant truth, such as the price reaction to PG&E filed a press release with an SEC Form 8-K announcing the suspension of the quarterly dividend beginning with Q4 2017 due to PG&E's responsibility for the North Bay Fires,[133] which was concealed by the alleged material omissions and/or misrepresentations (*i.e.*, a "corrective disclosure").[134] Such an event study would also need to consider whether and to what extent any non-fraud related information (*i.e.*, "confounding information") contributed to the observed price movement for the relevant PG&E Securities. If there is such confounding information, disaggregating the price impact of corrective disclosures from confounding information may utilize valuation techniques and may depend on information learned through discovery. Determining the specific valuation approach necessary to perform a loss causation analysis that reasonably disaggregates corrective and confounding information is an inherently case-specific question that depends on specific facts and circumstances. Examples of such techniques include, but are not limited to, fundamental valuation analysis such as discounted cash flow methods, valuation multiple methods (*i.e.*, price to earnings multiples, price

[132] I have not been asked to conduct a loss causation analysis at this time. In my experience, loss causation analyses are often informed by information learned in discovery.

[133] Complaint ¶ 339.

[134] The event study I have performed for this report is for Market Efficiency purposes and is not an attempt at valuing artificial inflation.

to EBITDA multiples, price to revenue multiples, etc.), use of academic studies regarding the value of certain types of information, and other available valuations whether from securities analysts or made available through discovery. Regardless of the technique used, it is performed on a class-wide basis – in other words, the specific methodology applies regardless of the identity or circumstances of any individual class member.

151. The loss causation analysis would also require an analysis of how inflation per share may have evolved over the class period. Again, the nature of this analysis is intensely factual, case-specific, and may depend on information learned through discovery. For example, an often-used method is to assume "constant dollar inflation," which implies that the artificial inflation was the same dollar amount during the class period. In certain circumstances, it may be more reasonable to apply "constant percentage inflation," which implies the price was inflated by a consistent percentage in the absence of additional disclosures. In other cases, the artificial inflation has evolved based upon the nature and timing of specific misstatements or the inflation varied on a daily basis as a result of information contained in internal documents obtained in discovery. To summarize, the determination of how artificial inflation evolved over the class period is also a case-specific, fact-specific loss causation exercise that can rely on valuation techniques including, but not limited to, event studies, fundamental valuation, contemporaneous valuations or documents, or some combination of the above. Once again, however, all of these loss causation methodologies are class-wide in nature and do not depend on the identity or circumstance of any specific investor.

152. Accordingly, although I have not been asked to calculate class-wide damages in this report, and such calculations would likely depend, in part, on the completion of discovery, and full development of the case record, based on my expertise and experience in dozens of similar

matters and understanding the nature of the claims in this case, I conclude that Section 10(b) damages in this action are subject to a well-settled, common methodology that can be applied to the Class as a whole.

153. Counsel for the Lead Plaintiff has also asked me to opine on whether per share damages could be measured for eligible purchasers of PG&E Notes during the Class Period under Section 11 using a common methodology. Section 11 damages calculations are based on Section 11(e) of the Securities Act which establishes the statutory formula by which damages for Section 11 claims are calculated. Specifically, Section 11(e) states the following:

> The suit authorized under subsection (a) of this section may be to recover such damages as shall represent the difference between the amount paid for the security (not exceeding the price at which the security was offered to the public) and (1) the value thereof as of the time such suit was brought, or (2) the price at which such security shall have been disposed of in the market before suit, or (3) the price at which such security shall have been disposed of after suit but before judgment if such damages shall be less than the damages representing the difference between the amount paid for the security (not exceeding the price at which the security was offered to the public) and the value thereof as of the time such suit was brought.[135]

154. Section 11 allows Defendants to offset some or all of these damages if they can prove that financial losses under the statutory formula were not caused by the false statements or omissions. Section 11 provides:

> if the defendant proves that any portion or all of such damages represents other than the depreciation in value of such security resulting from such part of the registration statement, with respect to which his liability is asserted, not being true or omitting to state a material fact required to be stated therein or necessary to make the statements therein not misleading, such portion of or all such damages shall not be recoverable.[136]

[135] 15 U.S.C. § 77k(e).

[136] 15 U.S.C. § 77k(e).

155. Any negative causation evidence would be applicable Class-wide as opposed to relevant for any specific investor. Therefore, even to the extent there is negative causation, damages can still be calculated on a Class-wide basis.

156. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on December 23, 2024.

Chad Coffman

Exhibit 1
Summary of PG&E Securities For Which I Have Been Asked to Opine on Market Efficiency

Security Type	#	CUSIP	Name/Ticker	Issue Date	Maturity Date	Redemption Price	Original Amount Issued	Par Value	Coupon/ Dividend
Common Stock		69331C108	PCG						
Preferred Stock	1	694308206	PCG_pa	11/18/1992	N/A	N/A	$4,211,662	$25	6.000%
	2	694308305	PCG_pb	12/11/2002	N/A	N/A	$1,173,163	$25	5.500%
	3	694308404	PCG_pc	11/18/1992	N/A	N/A	$400,000	$25	5.000%
	4	694308503	PCG_pd	6/29/1948	N/A	$26.75	$2,860,977	$25	5.000%
	5	694308602	PCG_pe	5/4/2009	N/A	$26.75	$1,719,388	$25	5.000%
	6	694308701	PCG_pg	1/25/1950	N/A	$27.25	$1,517,375	$25	4.800%
	7	694308800	PCG_ph	6/22/1954	N/A	$26.00	$1,127,426	$25	4.500%
	8	694308883	PCG_pi	10/25/1955	N/A	$25.75	$1,000,000	$25	4.360%
Notes	1	694308HY6	HY6	5/15/2018	12/1/2047	N/A	$849,800,000	$1,000	3.950%
	2	694308HR1	HR1	12/1/2016	12/1/2046	N/A	$600,000,000	$1,000	4.000%
	3	694308HN0	HN0	11/5/2015	3/15/2046	N/A	$450,000,000	$1,000	4.250%
	4	694308HL4	HL4	11/6/2014	3/15/2045	N/A	$600,000,000	$1,000	4.300%
	5	694308HH3	HH3	2/21/2014	2/15/2044	N/A	$675,000,000	$1,000	4.750%
	6	694308HF7	HF7	11/12/2013	11/15/2043	N/A	$500,000,000	$1,000	5.125%
	7	694308HD2	HD2	6/14/2013	6/15/2043	N/A	$375,000,000	$1,000	4.600%
	8	694308HA8	HA8	8/16/2012	8/15/2042	N/A	$350,000,000	$1,000	3.750%
	9	694308GZ4	GZ4	4/16/2012	4/15/2042	N/A	$400,000,000	$1,000	4.450%
	10	694308GY7	GY7	12/1/2011	12/15/2041	N/A	$250,000,000	$1,000	4.500%
	11	694308GS0	GS0	11/18/2009	1/15/2040	N/A	$800,000,000	$1,000	5.400%
	12	694308GQ4	GQ4	3/6/2009	3/1/2039	N/A	$550,000,000	$1,000	6.250%
	13	694308GM3	GM3	3/3/2008	2/15/2038	N/A	$400,000,000	$1,000	6.350%
	14	694308GJ0	GJ0	3/13/2007	3/1/2037	N/A	$950,000,000	$1,000	5.800%
	15	694308GE1	GE1	3/23/2004	3/1/2034	N/A	$3,000,000,000	$1,000	6.050%
	16	694308JA6	JA6	8/6/2018	8/1/2028	N/A	$300,000,000	$1,000	4.650%
	17	694308HW0	HW0	5/15/2018	12/1/2027	N/A	$1,129,736,000	$1,000	3.300%
	18	694308HS9	HS9	3/10/2017	3/15/2027	N/A	$400,000,000	$1,000	3.300%
	19	694308HP5	HP5	3/1/2016	3/1/2026	N/A	$600,000,000	$1,000	2.950%
	20	694308HM2	HM2	6/12/2015	6/15/2025	N/A	$600,000,000	$1,000	3.500%
	21	694308HK6	HK6	8/18/2014	8/15/2024	N/A	$350,000,000	$1,000	3.400%

Exhibit 1
Summary of PG&E Securities For Which I Have Been Asked to Opine on Market Efficiency

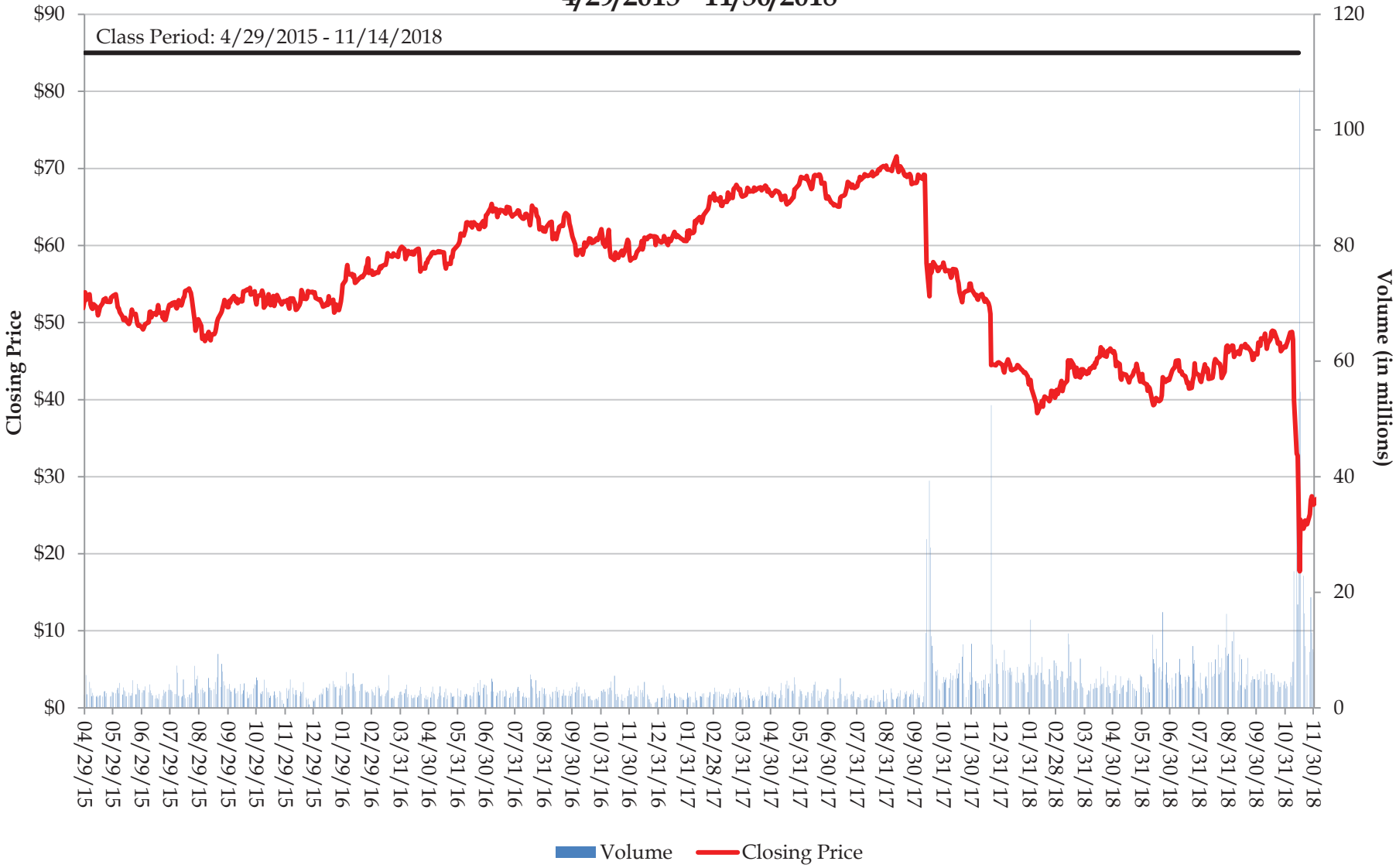
Security Type	#	CUSIP	Name/Ticker	Issue Date	Maturity Date	Redemption Price	Original Amount Issued	Par Value	Coupon/ Dividend
	22	694308HG5	HG5	2/21/2014	2/15/2024	N/A	$450,000,000	$1,000	3.750%
	23	694308HE0	HE0	11/12/2013	11/15/2023	N/A	$300,000,000	$1,000	3.850%
	24	694308HZ3	HZ3	8/6/2018	8/1/2023	N/A	$500,000,000	$1,000	4.250%
	25	694308HC4	HC4	6/14/2013	6/15/2023	N/A	$375,000,000	$1,000	3.250%
	26	694308HB6	HB6	8/16/2012	8/15/2022	N/A	$400,000,000	$1,000	2.450%
	27	694308GW1	GW1	9/12/2011	9/15/2021	N/A	$250,000,000	$1,000	3.250%
	28	694308GV3	GV3	5/13/2011	5/15/2021	N/A	$300,000,000	$1,000	4.250%
	29	694308GT8	GT8	9/15/2010	10/1/2020	N/A	$800,000,000	$1,000	3.500%

Sources: Complaint, LSEG Workspace (previously Eikon).

Exhibit 2
Summary of Efficiency Factors for PG&E Corporation Common Stock

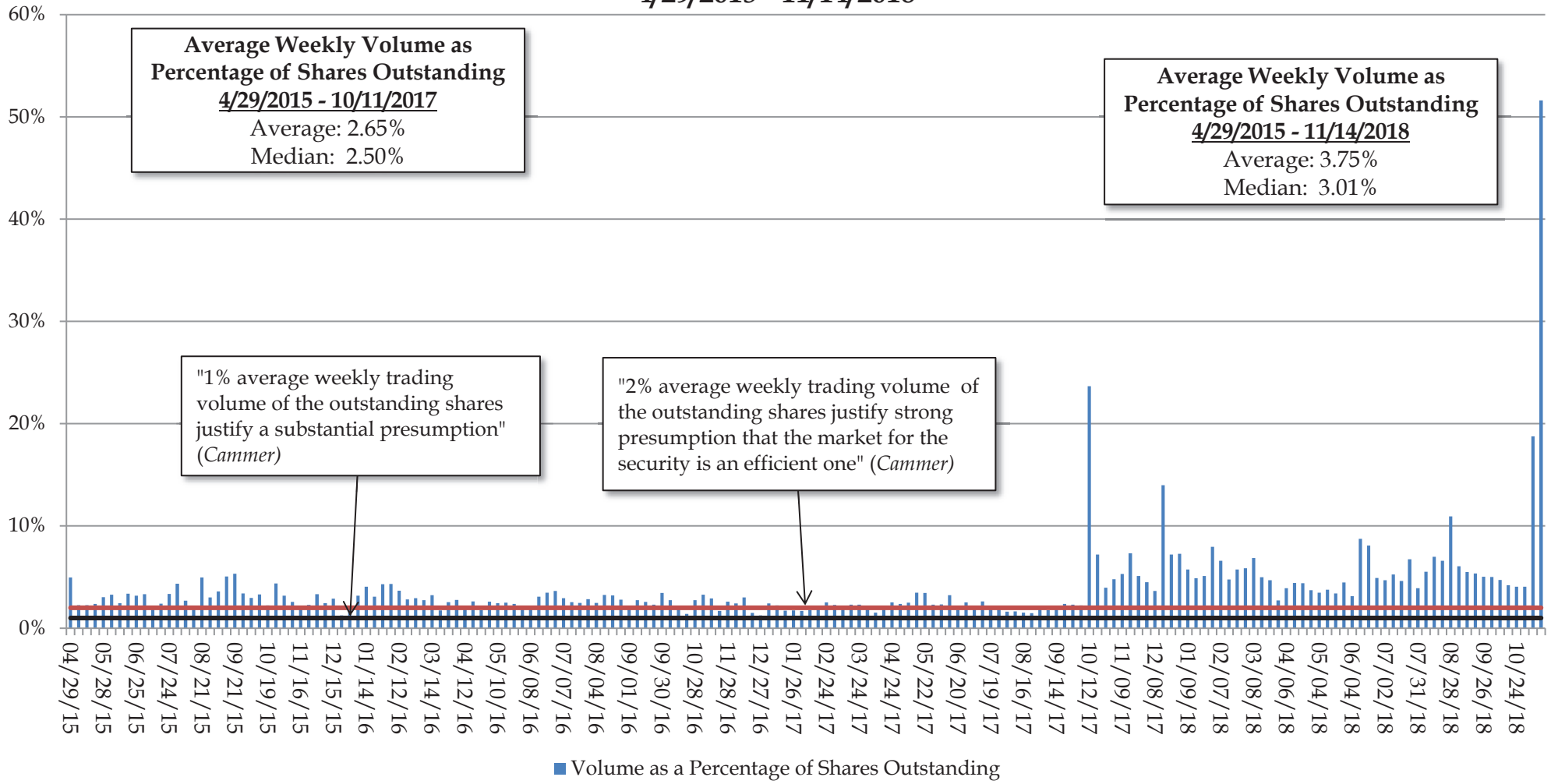
Factor	Summary of Factor	PG&E Common Stock
Average Weekly Trading Volume Cammer I	"Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for a security is an efficient one; 1% would justify a substantial presumption."	• The average weekly trading volume of 3.75%, as a percentage of shares outstanding, exceeds the standard of 2% that courts have suggested would justify a strong presumption of an efficient market (Note: 19.03 million shares traded weekly on average during the Class Period).
Analyst Coverage Cammer II	"…it would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors."	• During the Class Period at least 16 securities analysts issued 473 analyst reports which implies that important information relevant to trading PG&E Common Stock was widely communicated to the market.
Market Makers Cammer III	"For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption."	• Because PG&E's shares were exchange-traded on the NYSE during the Class Period, not over the counter, this factor is satisfied. Furthermore, according to the TICK database, throughout the Class Period, there were at least 14 exchanges on which PG&E Common Stock was traded.
SEC Form S-3 Eligibility Cammer IV	"It would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency."	• PG&E filed a Form S-3ASR, a Form S-3, and a Form S-3/A during the Class Period (on February 18, 2016, January 4, 2017, and January 19, 2017, respectively). I have found no evidence to believe that PG&E was not S-3 eligible throughout the Class Period, thus satisfying this factor.
Price Reaction to New Information Cammer V	"…one of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price."	• The event study demonstrates a clear cause and effect relationship. A statistical test shows a significant contemporaneous relationship between new firm-specific news and significant changes in the market price for PG&E Common Stock.
Market Capitalization	Firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."	• As of 9/30/2017 and 12/31/2018, PG&E's market capitalization was $34.92 billion and $12.36 billion, respectively, which is at least the 91st percentile of all NYSE and NASDAQ stocks. PG&E Common Stock therefore easily meets this criterion.
Bid-Ask Spread	The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price.	• During the Class Period, the average percentage bid-ask spread for PG&E Common Stock in each month ranged from 0.005% to 0.023%. PG&E's average percentage bid-ask spread was well below the mean and median bid-ask spread of a random sample of 100 other common stocks trading on the NASDAQ and NYSE in December 2015 (the full month when PG&E had the largest bid-ask spread). This supports a finding of efficiency.
Float and Institutional Ownership	Institutional investors are considered to be sophisticated, well-informed investors with access to most publicly available information for the stocks that they own.	• On average over 99% of PG&E shares were held by non-insiders. 1,446 institutions held the vast majority of the public float throughout the Class Period which further supports the finding that PG&E Common Stock traded in an efficient market.
Autocorrelation	If autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it suggests market inefficiency because past price movements are not fully reflected in the current price.	• There was no evidence of statistically significant autocorrelation, which means that there was no systematic opportunity for a trader to profit from trading PG&E Common Stock based solely on its past price movements. This supports a finding of efficiency.
Options	Empirical analysis has shown that option listings are associated with a decrease in bid-ask spread and increase in quoted depth, trading volume, trading frequency, and transaction size – an overall improvement of the market quality of the underlying stocks.	• There were 868,829 PG&E Common Stock put contracts and 1,720,314 PG&E Common Stock call contracts that traded during the Class Period. PG&E Common Stock therefore easily meets this criterion.

Exhibit 3
PG&E Common Stock Price & Volume
4/29/2015 - 11/30/2018



Sources: Complaint and S&P Capital IQ.

Exhibit 4
PG&E Common Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding 4/29/2015 - 11/14/2018



Source: S&P Capital IQ.

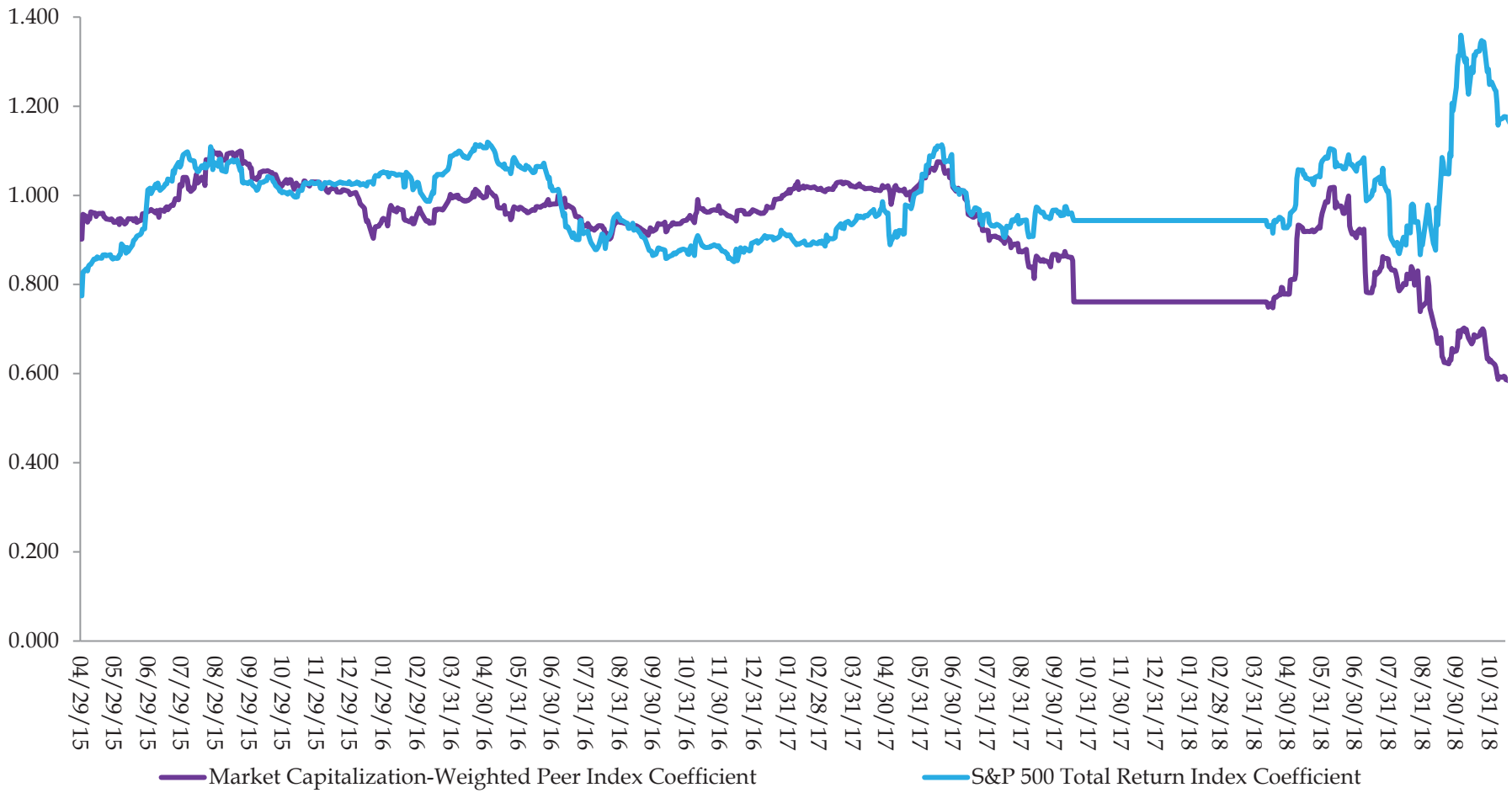
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Exhibit 5
Summary of Securities Analyst Reports Issued for PG&E

	Analyst Name	Reports Issued During the Class Period: 4/29/2015 - 11/14/2018
[1]	MORNINGSTAR	97
[2]	DEUTSCHE BANK	53
[3]	EVERCORE ISI	46
[4]	J.P. MORGAN	37
[5]	JEFFERIES	29
[6]	RBC CAPITAL MARKETS	29
[7]	MORGAN STANLEY	28
[8]	GUGGENHEIM SECURITIES, LLC	26
[9]	UBS RESEARCH	26
[10]	WELLS FARGO SECURITIES, LLC	25
[11]	WOLFE RESEARCH	25
[12]	BARCLAYS	17
[13]	MACQUARIE RESEARCH	12
[14]	ARGUS RESEARCH CORP	10
[15]	BMO CAPITAL MARKETS	7
[16]	CREDIT SUISSE	6
	Total	**473**

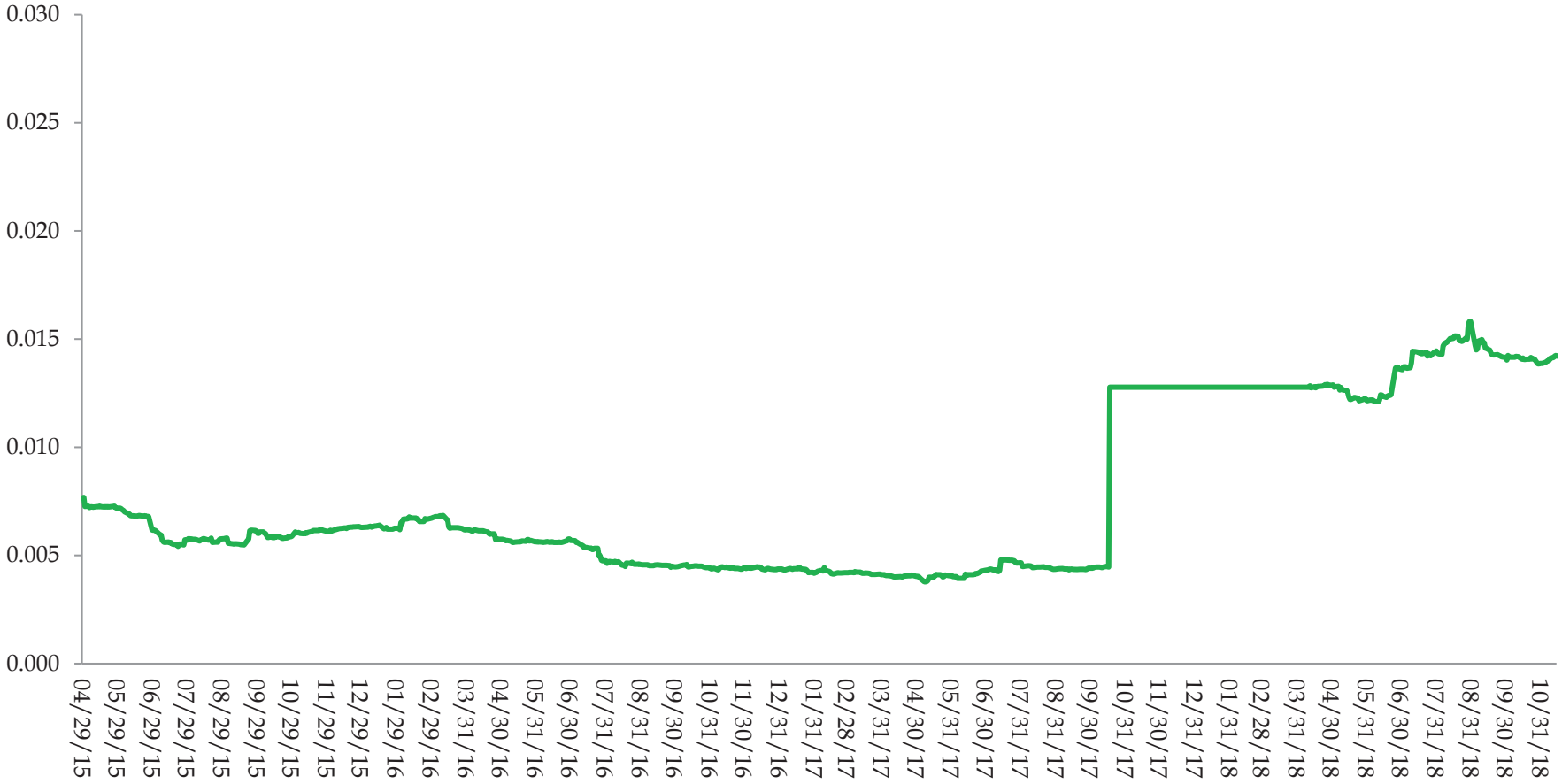
Source: Investext and Counsel.
Note: Many analyst reports are not available through third party data providers (*e.g.,* Investext); therefore, this almost certainly understates the total amount of analyst coverage.

Exhibit 6
Coefficients from Event Study Regressions for PG&E
4/29/2015 - 11/14/2018



Note: The results are based on a rolling regression of the previous 120 trading days through October 17, 2017, followed by a fixed-to-rolling regression beginning on October 18, 2017. The fixed-to-rolling regression was conducted to account for the volatility due to the events of the North Bay fires. The regression model controls for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is a market capitalization-weighted index consisting of the members of the Dow Jones Utility Average Index during the Class Period, excluding PG&E. Earnings announcements, the alleged corrective disclosure dates, and two outlier dates have been removed from estimation (*i.e.*, 10/16/2017: a day immediately following one of the alleged corrective disclosures with a highly statistically significant return, and 10/17/2017: another highly statistically significant day where news spread of a suspected wildfire arsonist arrested in California).

Exhibit 7
Standard Deviation of the Errors for Event Study Regressions for PG&E Common Stock
4/29/2015 - 11/14/2018



Note: The results are based on a rolling regression of the previous 120 trading days through October 17, 2017, followed by a fixed-to-rolling regression beginning on October 18, 2017. The fixed-to-rolling regression was conducted to account for the volatility due to the events of the North Bay fires. The regression model controls for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is a market capitalization-weighted index consisting of the members of the Dow Jones Utility Average Index during the Class Period, excluding PG&E. Earnings announcements, the alleged corrective disclosure dates, and two outlier dates have been removed from estimation (*i.e.*, 10/16/2017: a day immediately following one of the alleged corrective disclosures with a highly statistically significant return, and 10/17/2017: another highly statistically significant day where news spread of a suspected wildfire arsonist arrested in California).

Exhibit 8
Event Study Analysis of PG&E Earnings Announcements for PG&E Common Stock

								Event Study Results				
#	Date	Time	Market Date	Event	Headline	Closing Price	Raw Return	Abnormal Return	Abnormal Dollar Change	t-Stat	P-Value	Sig Level
1	4/29/2015	8:42 AM	4/29/2015	Q1 2015 Earnings	PG&E Corporation Releases First-Quarter 2015 Results *Source - Business Wire*	$53.92	2.51%	2.76%	$0.00	3.60	0.00	***
2	7/29/2015	8:38 AM	7/29/2015	Q2 2015 Earnings	PG&E Corporation Releases Second-Quarter Financial Results *Source - Business Wire*	$52.34	0.11%	-0.26%	-$0.13	-0.45	0.65	
3	10/28/2015	9:22 AM	10/28/2015	Q3 2015 Earnings	PG&E Corporation Releases Third Quarter Financial Results *Source - Business Wire*	$52.95	-2.07%	-1.00%	-$0.54	-1.71	0.09	*
4	2/18/2016	9:16 AM	2/18/2016	Q4 2015 Earnings	PG&E Corporation Releases Full-Year and Fourth-Quarter 2015 Financial Results *Source - Business Wire*	$56.00	0.34%	-1.34%	-$0.75	-2.00	0.05	**
5	5/4/2016	9:23 AM	5/4/2016	Q1 2016 Earnings	PG&E Corporation Releases First-Quarter 2016 Financial Results *Source - Business Wire*	$59.14	0.22%	-1.00%	-$0.59	-1.75	0.08	*
6	7/28/2016	9:16AM	7/28/2016	Q2 2016 Earnings	PG&E Corporation Releases Second-Quarter 2016 Financial Results *Source - Business Wire*	$63.75	-0.31%	-0.60%	-$0.38	-1.25	0.21	
7	11/4/2016	9:12 AM	11/4/2016	Q3 2016 Earnings	PG&E Corporation Releases Third-Quarter 2016 Financial Results *Source - Business Wire*	$59.83	-0.61%	-0.20%	-$0.12	-0.45	0.66	
8	2/16/2017	8:45 AM	2/16/2017	Q4 2016 Earnings	PG&E Corporation Releases Full-Year and Fourth-Quarter 2016 Financial Results *Source - Business Wire*	$63.39	0.71%	-0.49%	-$0.31	-1.17	0.24	
9	5/2/2017	8:55 AM	5/2/2017	Q1 2017 Earnings	PG&E Corporation Releases First-Quarter 2017 Financial Results *Source - Business Wire*	$66.79	0.50%	0.17%	$0.11	0.41	0.68	
10	7/27/2017	8:51 AM	7/27/2017	Q2 2017 Earnings	PG&E Corporation Releases Second-Quarter 2017 Financial Results *Source - Business Wire*	$67.55	-0.52%	-0.86%	-$0.58	-1.84	0.07	*
11	11/2/2017	8:57 AM	11/2/2017	Q3 2017 Earnings	PG&E Corporation Releases Third-Quarter 2017 Financial Results *Source - Business Wire*	$56.65	-1.03%	-1.28%	-$0.73	-1.00	0.32	
12	2/9/2018	8:54 AM	2/9/2018	Q4 2017 Earnings	PG&E Corporation Releases Full-Year and Fourth-Quarter 2017 Financial Results *Source - Business Wire*	$38.57	0.86%	-0.92%	-$0.35	-0.72	0.47	
13	5/3/2018	8:58 AM	5/3/2018	Q1 2018 Earnings	PG&E Corporation Releases First-Quarter 2018 Financial Results *Source - Business Wire*	$44.37	-3.27%	-3.15%	-$1.44	-2.46	0.02	**
14	7/26/2018	8:47 AM	7/26/2018	Q2 2018 Earnings	PG&E Corporation Releases Second-Quarter 2018 Financial Results *Source - Business Wire*	$44.70	3.98%	3.10%	$1.33	2.17	0.03	**
15	11/5/2018	8:44 AM	11/5/2018	Q3 2018 Earnings	PG&E Corporation Releases Third-Quarter 2018 Financial Results *Source - Business Wire*	$48.71	2.68%	1.44%	$0.68	1.03	0.30	

Sources: S&P Capital IQ and Factiva.
Notes:
(1) The results are based on a rolling regression of the previous 120 trading days through October 17, 2017, followed by a fixed-to-rolling regression beginning on October 18, 2017. The fixed-to-rolling regression was conducted to account for the volatility due to the events of the North Bay fires. The regression model controls for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is a market capitalization-weighted index consisting of the members of the Dow Jones Utility Average Index during the Class Period, excluding PG&E. Earnings announcements, the alleged corrective disclosure dates, and two outlier dates have been removed from estimation (*i.e.*, 10/16/2017: a day immediately following one of the alleged corrective disclosures with a highly statistically significant return, and 10/17/2017: another highly statistically significant day where news spread of a suspected wildfire arsonist arrested in California).

(2) "***" Denotes statistical significance at the 99% confidence level or greater. "**" Denotes statistical significance at the 95% confidence level or greater. "*" Denotes statistical significance at the 90% confidence level or greater.

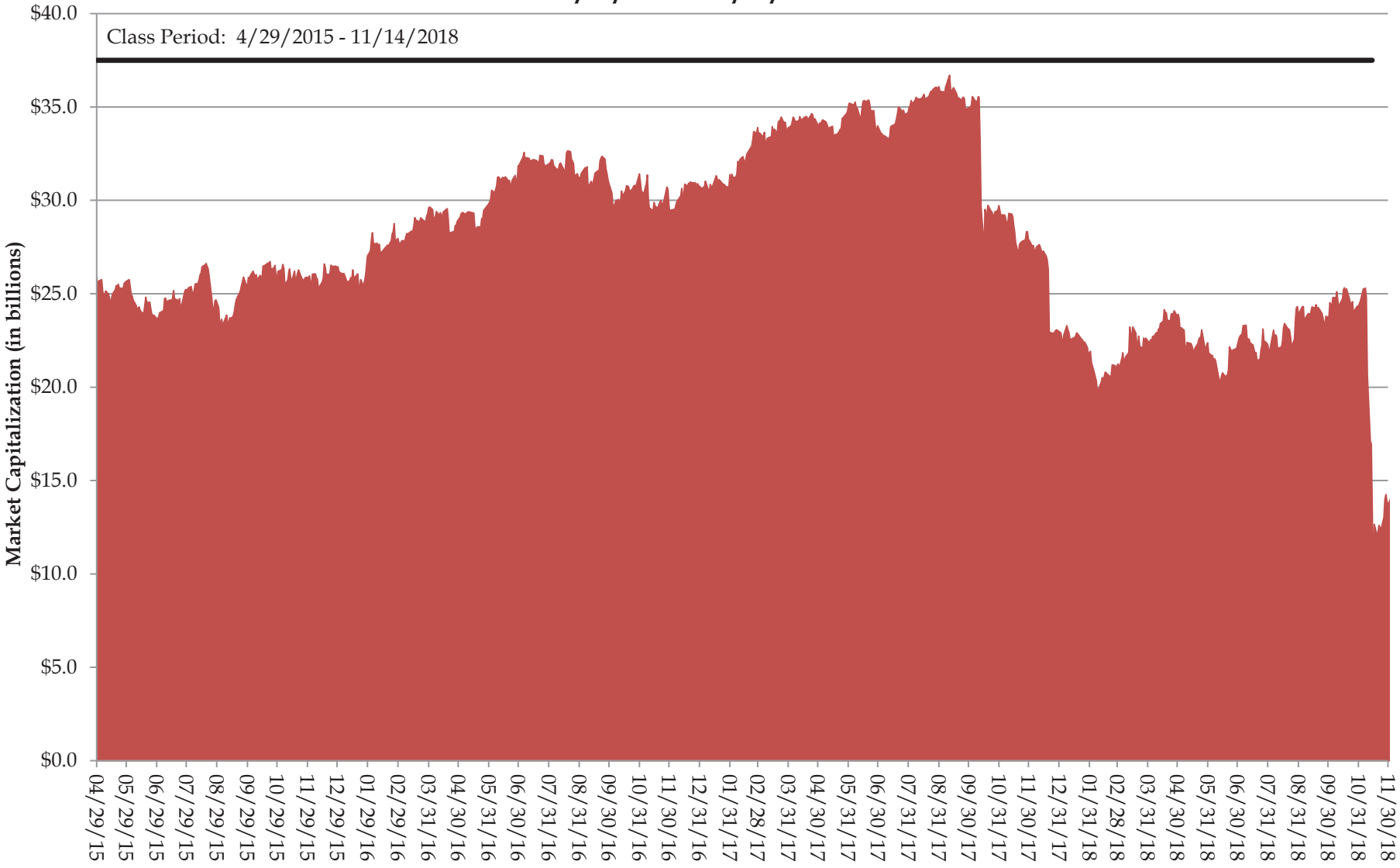
Exhibit 9

Comparison of Statistical Significance, Abnormal Returns, and Volume for PG&E Earnings Announcements for PG&E Common Stock vs. Days with Least Amount of News during the Class Period

Statistic	Earnings Announcements	Days with the Least Amount of News
N [(1)]	15	67
Significant Days at 95% Confidence Level	4	4
% Significant Days at 95% Confidence Level [(2)]	26.67%	5.97%
Average Absolute Abnormal Return [(3)]	1.24%	0.41%
Average Volume (Millions) [(4)]	4.5	2.8

Notes:
(1) Results are based on the Class Period. For the purposes of this analysis, I selected the 67 days with the least amount of news. Days with the least amount of news were days that had five or fewer news articles via the Factiva database, and no analyst reports or SEC filings to my knowledge. There were originally 70 days that I identified based on these criteria. However, there were three days with news articles that I could not dismiss as immaterial: April 27, 2016, October 27, 2016, and March 13, 2018.
(2) 26.67% rate of statistical significance is statistically significantly different than 5.97% at the 95% confidence level using both a Chi-Square test and a Fisher's Exact test.
(3) 1.24% absolute return is statistically significantly different than 0.41% based on a t-test for difference of means at the 99% confidence level.
(4) The difference between 4.5 million and 2.8 million is statistically significant at the 99% confidence level.

Exhibit 10
PG&E Common Stock Market Capitalization
4/29/2015 - 11/30/2018



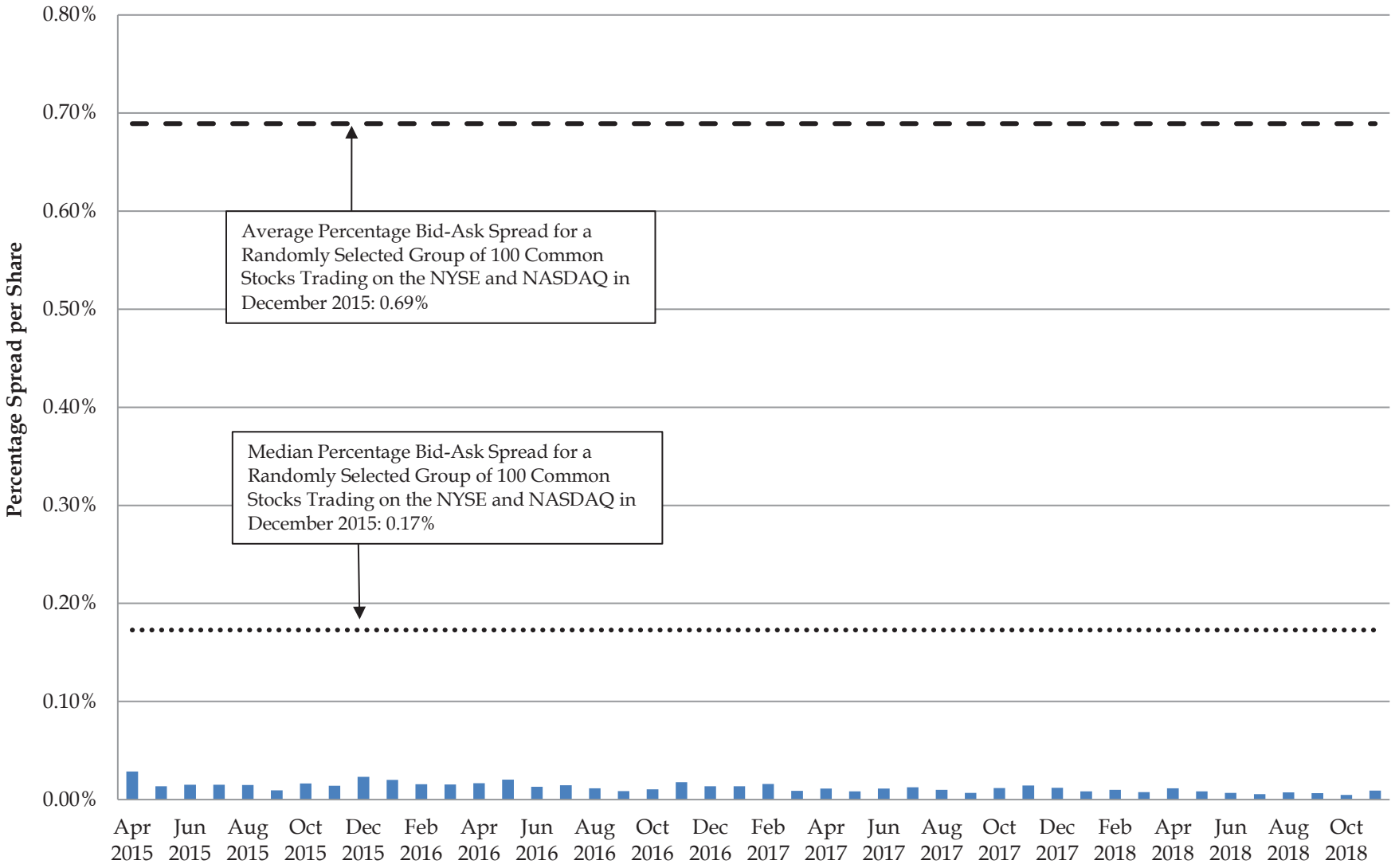
Sources: Complaint and S&P Capital IQ.

Exhibit 11
PG&E Common Stock
Market Capitalization Rankings

Last trading day of:	Market Capitalization (billions)	Percentile Rank on NYSE & NASDAQ
Q2 2015	$23.65	95%
Q3 2015	$25.88	96%
Q4 2015	$26.17	96%
Q1 2016	$29.60	96%
Q2 2016	$31.84	97%
Q3 2016	$30.90	96%
Q4 2016	$30.80	96%
Q1 2017	$33.88	97%
Q2 2017	$34.00	96%
Q3 2017	$34.92	96%
Q4 2017	$23.06	94%
Q1 2018	$22.62	94%
Q2 2018	$21.98	94%
Q3 2018	$23.79	94%
Q4 2018	$12.36	91%

Sources: Bloomberg and S&P Capital IQ.

Exhibit 12
PG&E Common Stock Average Monthly Bid-Ask Percentage Spread
4/29/2015 - 11/14/2018



Source: LSEG Workspace (formerly Eikon) and TICK Data.
Note: April 2015 and November 2018 data are limited to the Class Period.

Exhibit 13
PG&E Common Stock Shares Outstanding, Insider Holdings, and Institutional Holdings

Date	Shares Outstanding (in 000s)	Total Institutions Owning Stock	Insider Holdings (in 000s)	Short Interest (in 000s)	Public Float (in 000s)	Insider Holdings % of Shares Outstanding	Total Institutional Holdings (in 000s)	Institutional Holdings % of Shares Outstanding	Institutional Holdings % of Public Float
[1]	[2]	[3]	[4]	[5]	[6] = [2] + [5] - [4]	[7] = [4] / [2]	[8]	[9] = [8] / [2]	[10] = [8] / [6]
6/30/2015	481,575	656	502	5,712	486,786	0.10%	397,509	83%	82%
9/30/2015	490,178	652	832	6,795	496,141	0.17%	414,061	84%	83%
12/31/2015	492,025	686	834	5,394	496,585	0.17%	411,455	84%	83%
3/31/2016	495,607	723	637	5,201	500,171	0.13%	417,921	84%	84%
6/30/2016	498,143	733	645	5,610	503,108	0.13%	420,535	84%	84%
9/30/2016	505,184	729	643	4,962	509,504	0.13%	427,466	85%	84%
12/31/2016	506,892	734	838	5,021	511,074	0.17%	429,299	85%	84%
3/31/2017	510,610	752	713	5,585	515,481	0.14%	434,805	85%	84%
6/30/2017	512,221	793	1,061	7,349	518,508	0.21%	432,527	84%	83%
9/30/2017	512,822	797	1,049	6,252	518,025	0.20%	434,019	85%	84%
12/31/2017	514,423	813	1,034	7,690	521,079	0.20%	431,973	84%	83%
3/31/2018	514,969	800	878	12,176	526,268	0.17%	432,762	84%	82%
6/30/2018	516,428	783	1,024	7,503	522,906	0.20%	436,580	85%	83%
9/30/2018	517,151	790	1,534	10,458	526,075	0.30%	442,268	86%	84%
12/31/2018	520,339	697	1,586	12,705	531,458	0.30%	453,155	87%	85%
Total Institutions over Class Period:		**1,446**			**Class Period Average:**	**0.18%**		**84.54%**	**83.50%**

Sources: S&P Capital IQ and SEC filings.

(1) S&P Capital IQ updates short interest every two weeks while updates to institutional holdings via 13-F filings are only available every quarter; therefore, occasionally the time difference in data updates may cause institutional holdings to appear to exceed shares outstanding and the public float.

Exhibit 14
PG&E Common Stock
Test for Autocorrelation During the Class Period

Quarter	Coefficient on Previous Day's Abnormal Return[1]	t-Statistic	Sig Level [2]
Q2 2015	-0.15	-1.29	
Q3 2015	0.05	0.37	
Q4 2015	0.01	0.09	
Q1 2016	-0.02	-0.17	
Q2 2016	-0.12	-0.91	
Q3 2016	0.13	1.06	
Q4 2016	-0.24	-1.96	*
Q1 2017	-0.19	-1.50	
Q2 2017	0.17	1.33	
Q3 2017	-0.18	-1.48	
Q4 2017	0.17	1.35	
Q1 2018	-0.19	-1.51	
Q2 2018	-0.16	-1.30	
Q3 2018	0.03	0.24	
Q4 2018	0.15	0.71	
Class Period	**0.05**	**1.57**	

Source: S&P Capital IQ.
Notes:
(1) For each quarter I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable. Earnings announcements and the alleged corrective disclosure dates have been removed from estimation.
(2) *** Denotes statistical significance at the 99% confidence level or greater. ** Denotes statistical significance at the 95% confidence level or greater. * Denotes statistical significance at the 90% confidence level or greater.
(3) The last four trading days have been removed from the analysis. The outlier dates had high volatility and statistical significance due to the events of the alleged corrective disclosures. These dates had an abnormally large impact on the results, making autocorrelation during the Class Period appear to be significant at the 99% level. Removing the outlier dates resulted in an outcome that was not statistically significant.

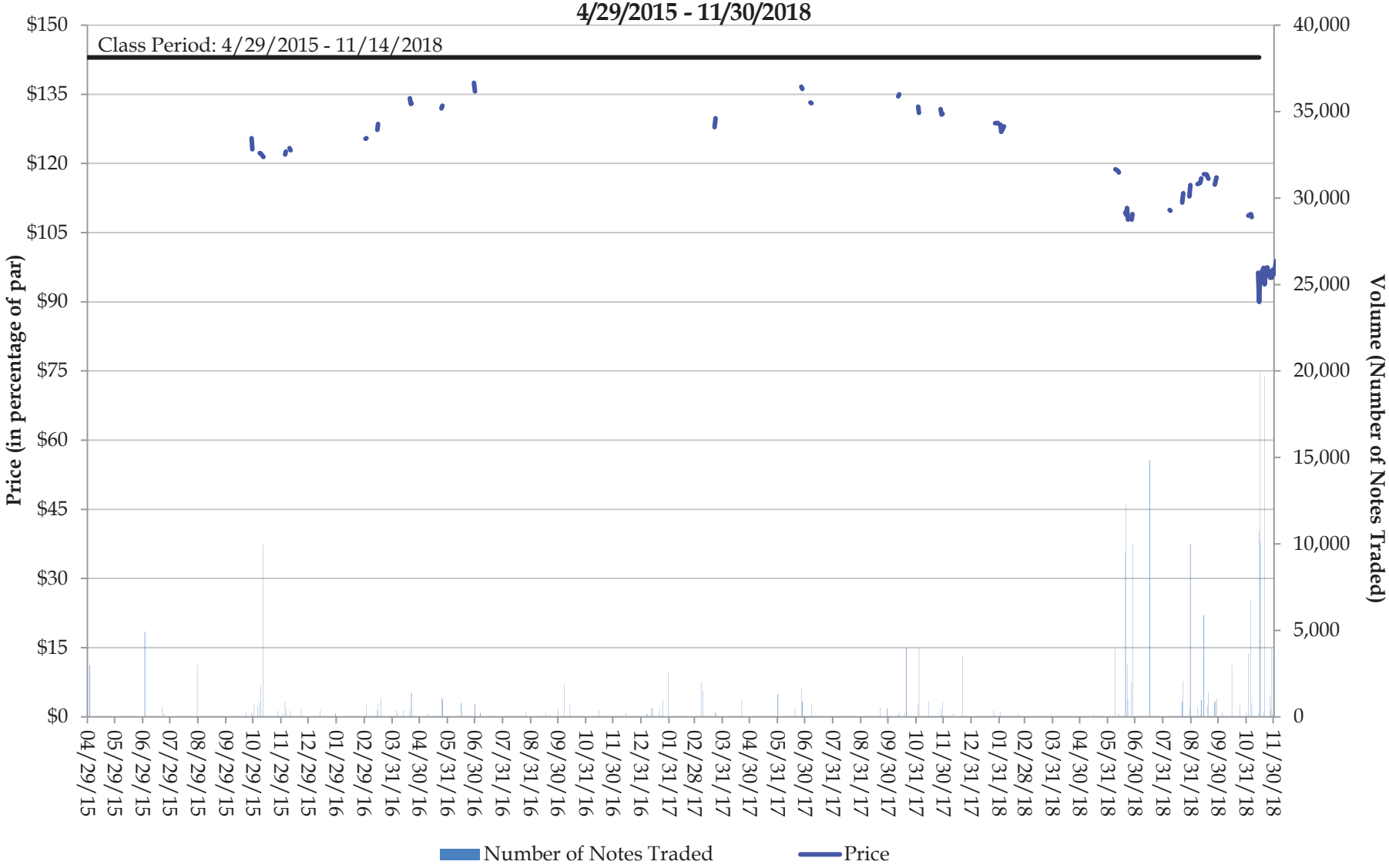
Exhibit 15 - 1
PG&E 6.05% Note Price & Volume
CUSIP: 694308GE1
4/29/2015 - 11/30/2018

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 2
PG&E 5.80% Note Price & Volume
CUSIP: 694308GJ0
4/29/2015 - 11/30/2018

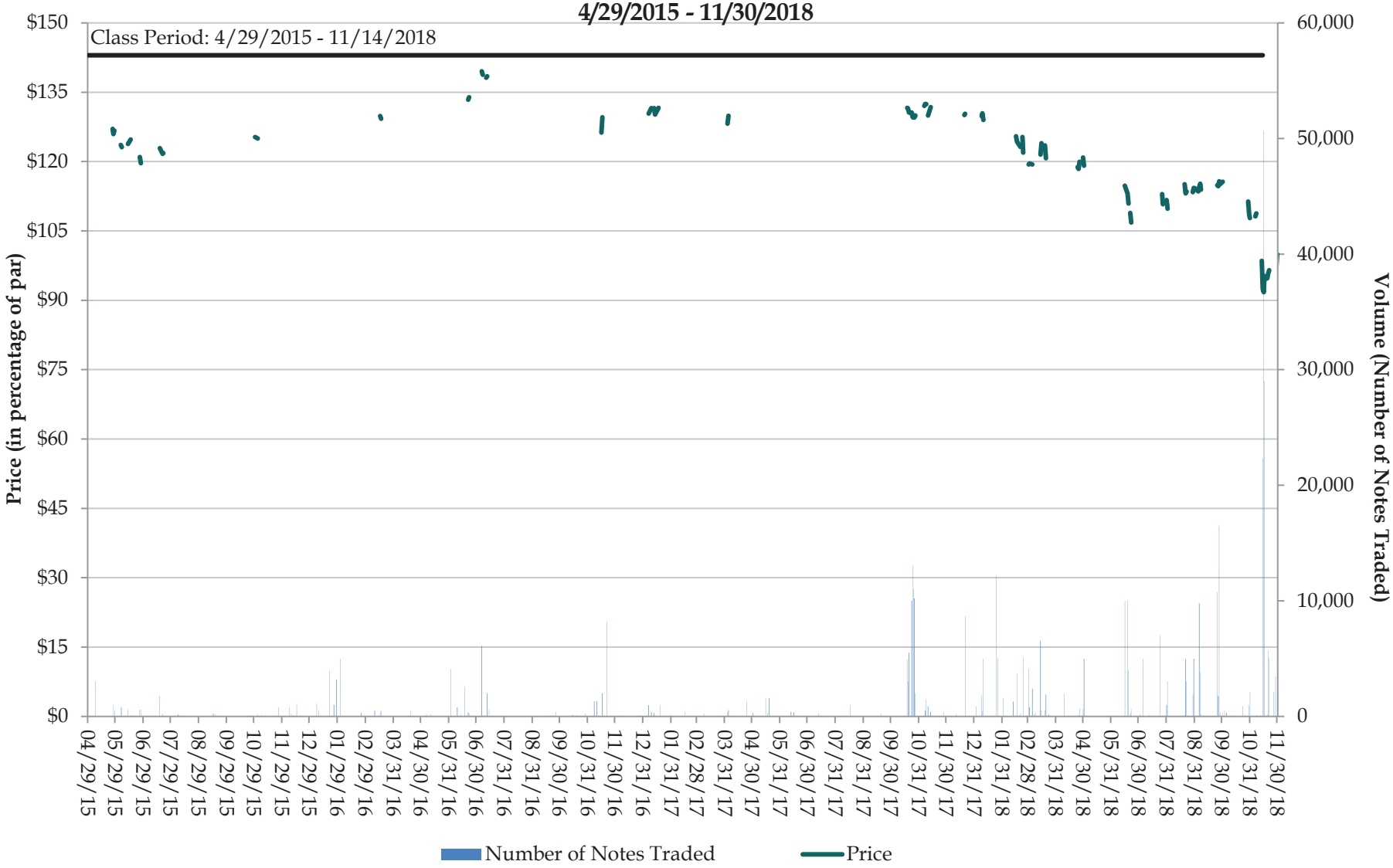
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 3
PG&E 6.35% Note Price & Volume
CUSIP: 694308GM3
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 4
PG&E 6.25% Note Price & Volume
CUSIP: 694308GQ4
4/29/2015 - 11/30/2018

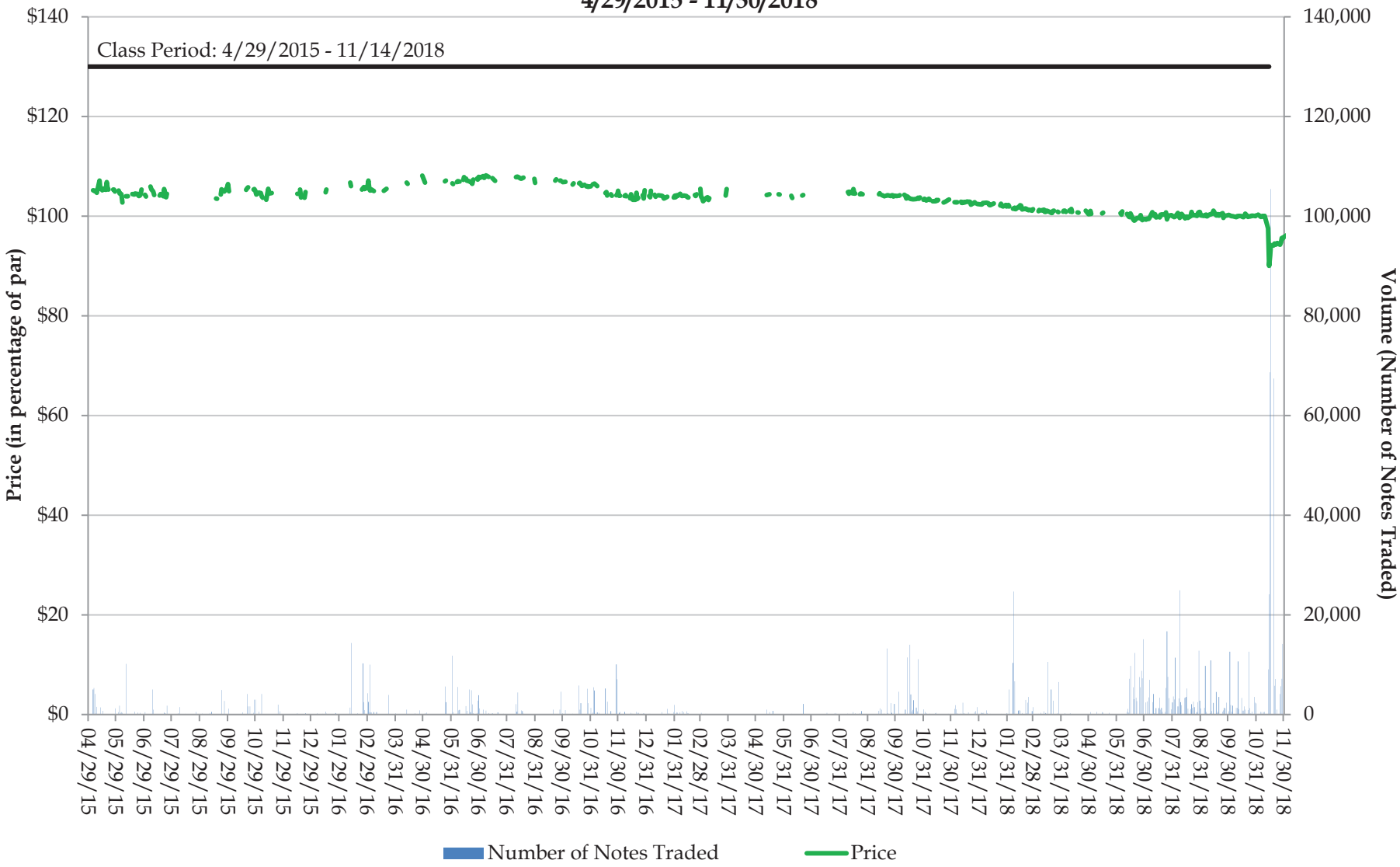


Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 5
PG&E 5.40% Note Price & Volume
CUSIP: 694308GS0
4/29/2015 - 11/30/2018

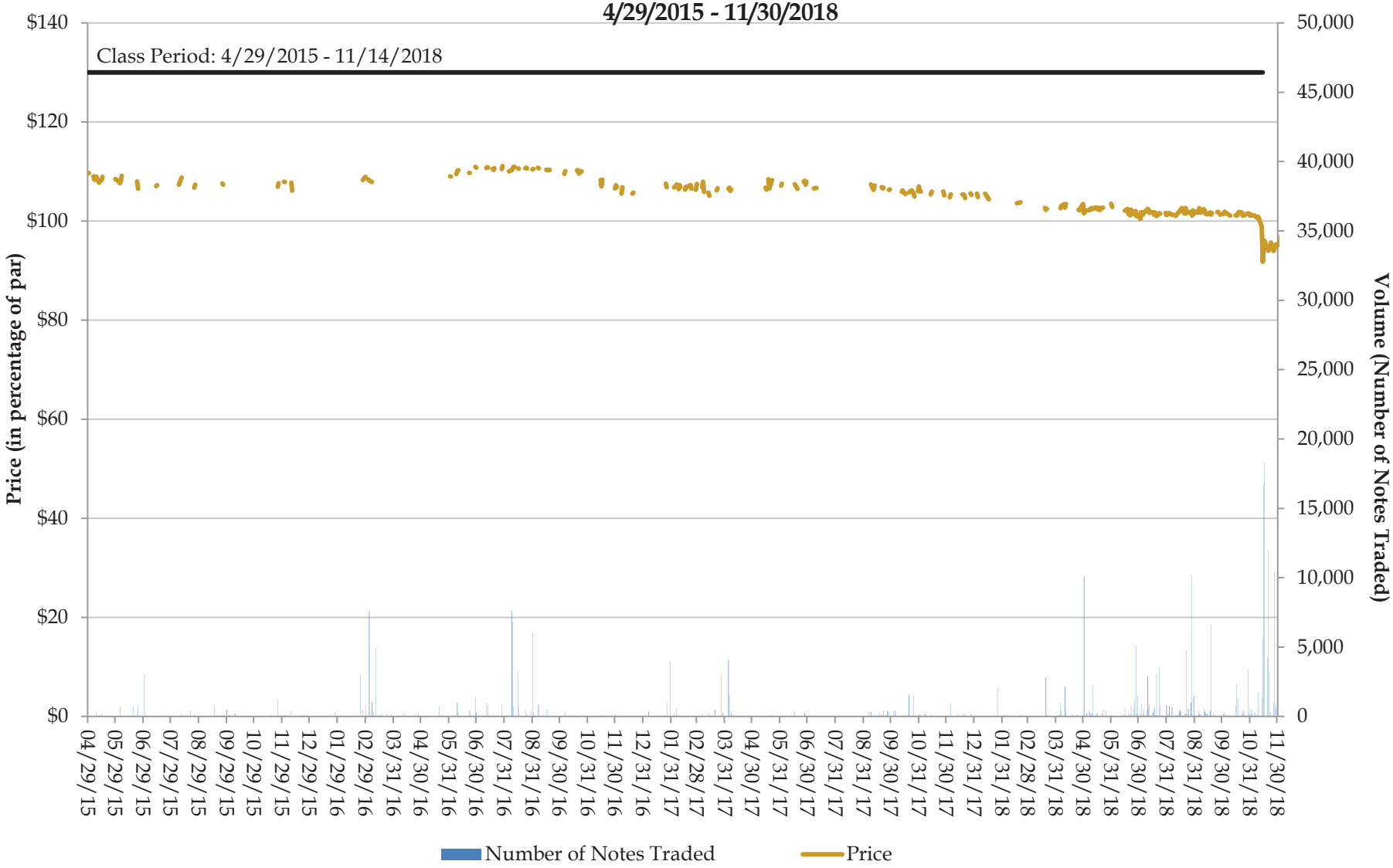
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 6
PG&E 3.50% Note Price & Volume
CUSIP: 694308GT8
4/29/2015 - 11/30/2018



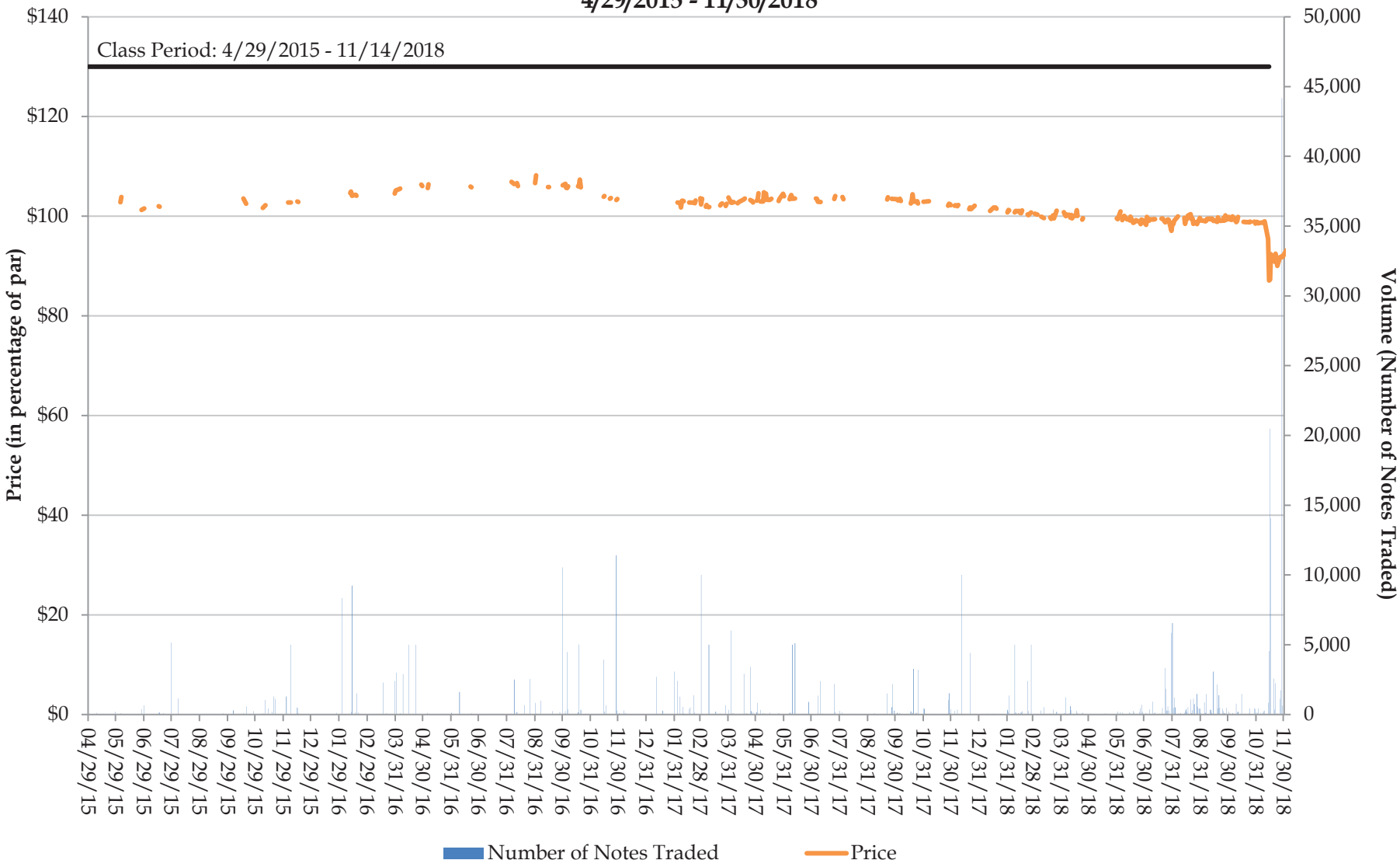
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 7
PG&E 4.25% Note Price & Volume
CUSIP: 694308GV3
4/29/2015 - 11/30/2018



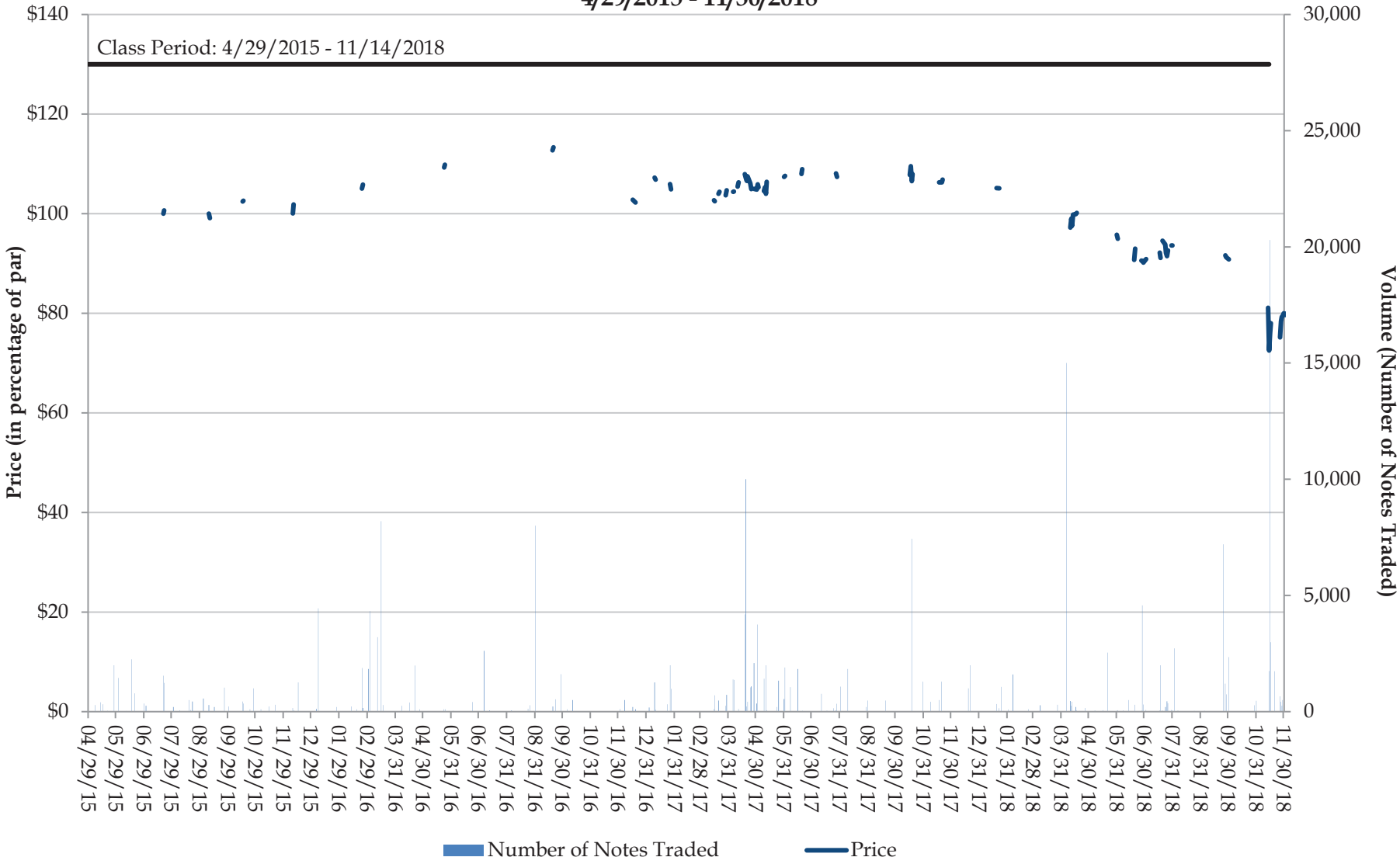
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 8
PG&E 3.25% Note Price & Volume
CUSIP: 694308GW1
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 9
PG&E 4.50% Note Price & Volume
CUSIP: 694308GY7
4/29/2015 - 11/30/2018

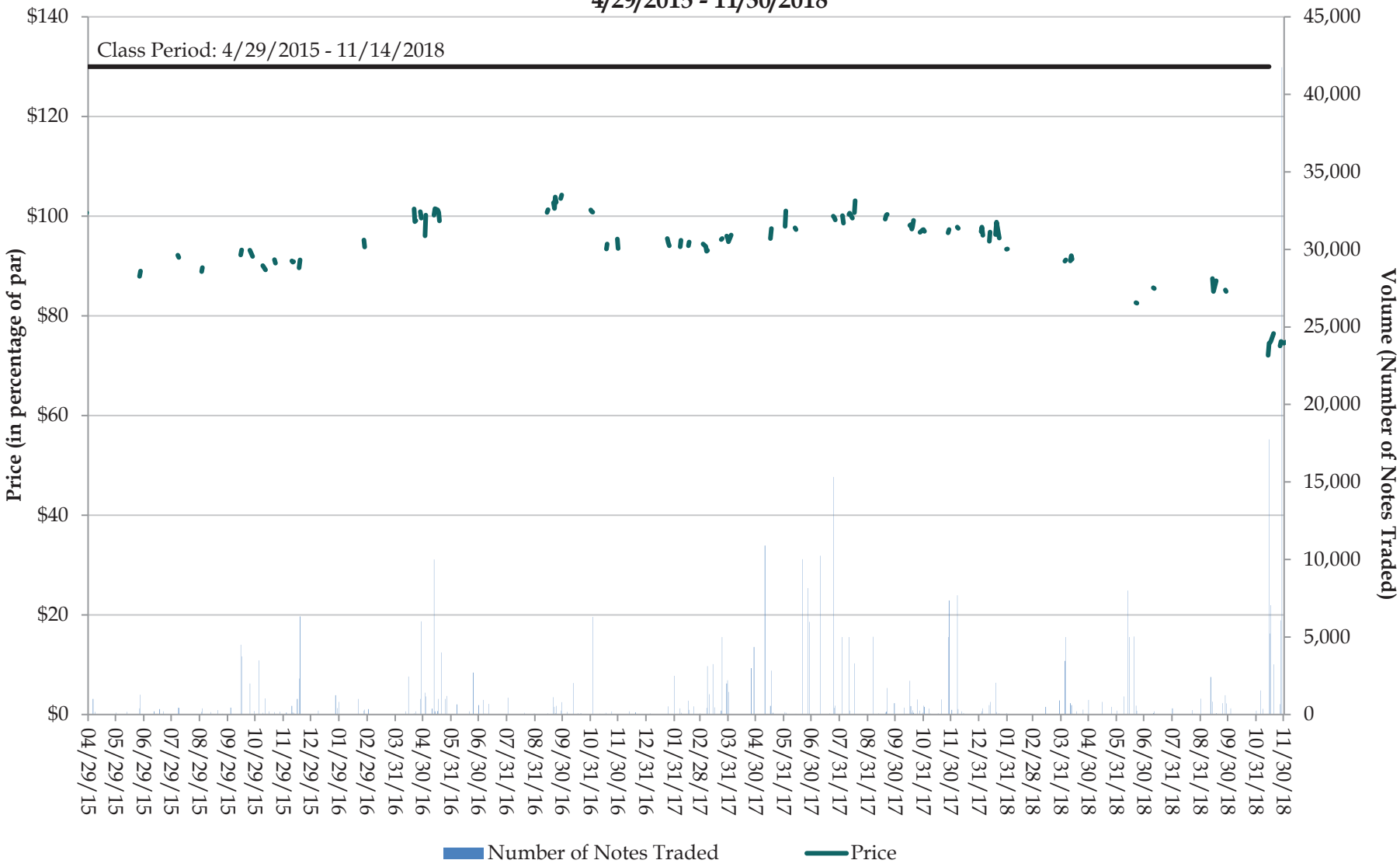


Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 10
PG&E 4.45% Note Price & Volume
CUSIP: 694308GZ4
4/29/2015 - 11/30/2018

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 11
PG&E 3.75% Note Price & Volume
CUSIP: 694308HA8
4/29/2015 - 11/30/2018

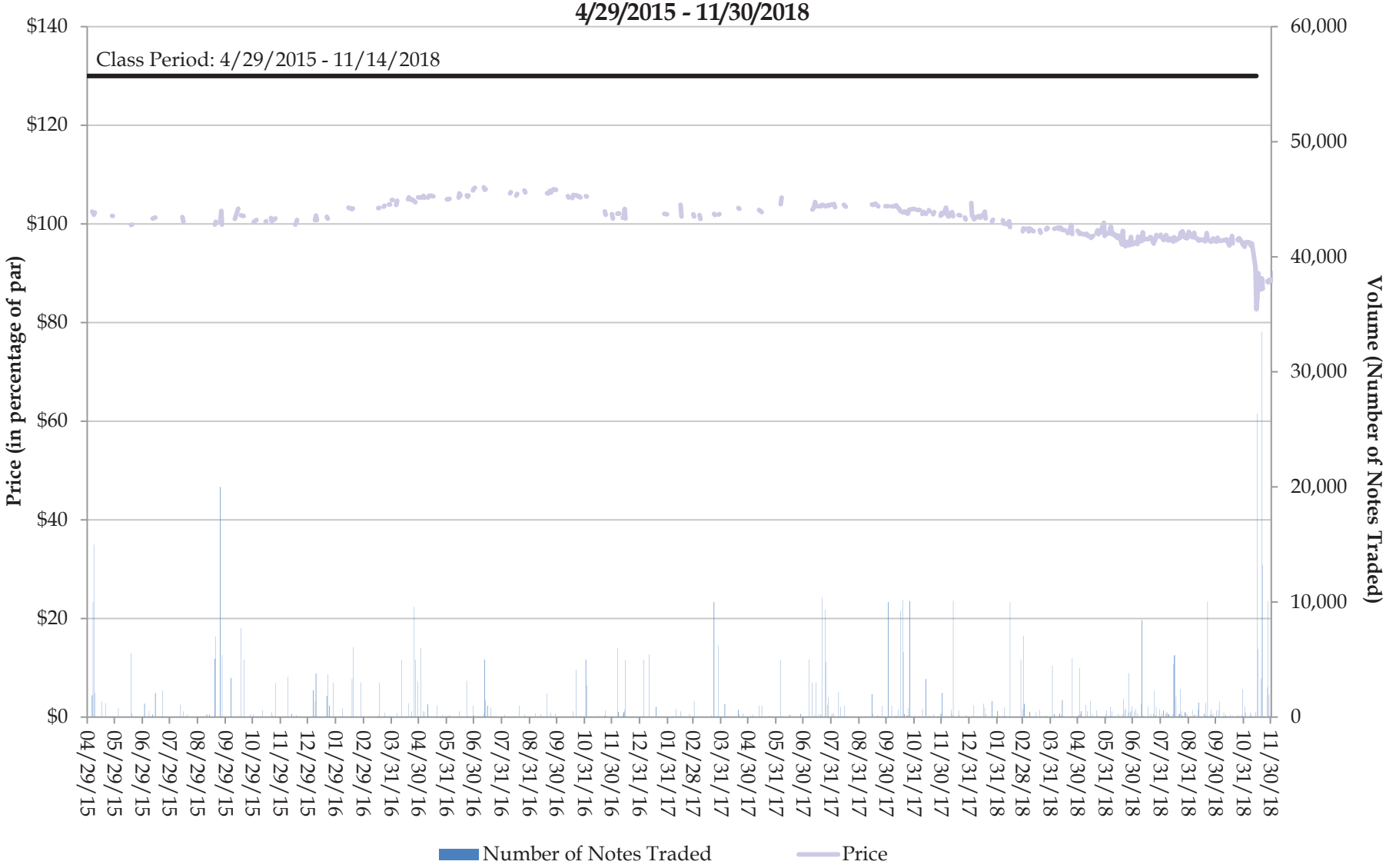


Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 12
PG&E 2.45% Note Price & Volume
CUSIP: 694308HB6
4/29/2015 - 11/30/2018

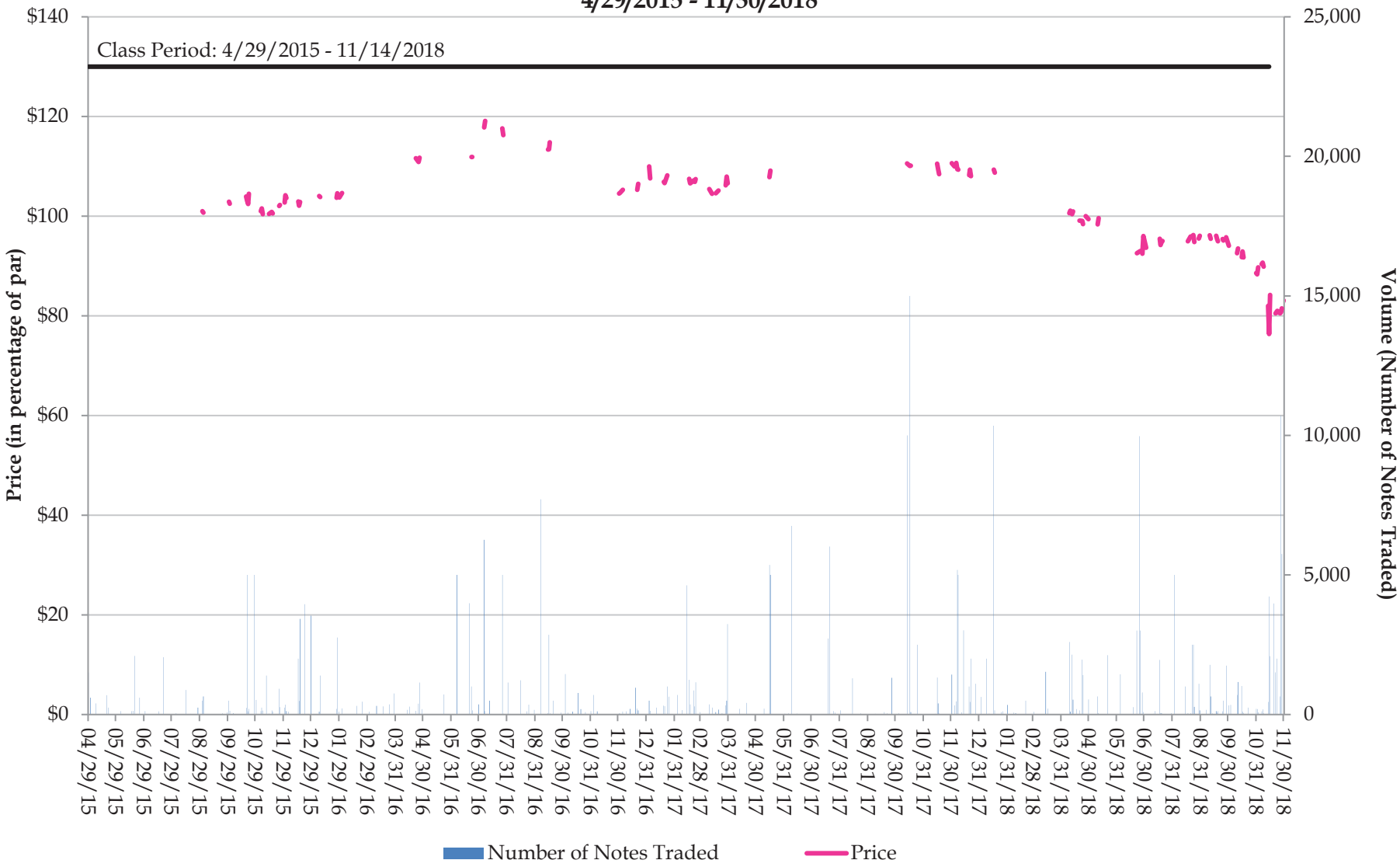
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 13
PG&E 3.25% Note Price & Volume
CUSIP: 694308HC4
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 14
PG&E 4.60% Note Price & Volume
CUSIP: 694308HD2
4/29/2015 - 11/30/2018

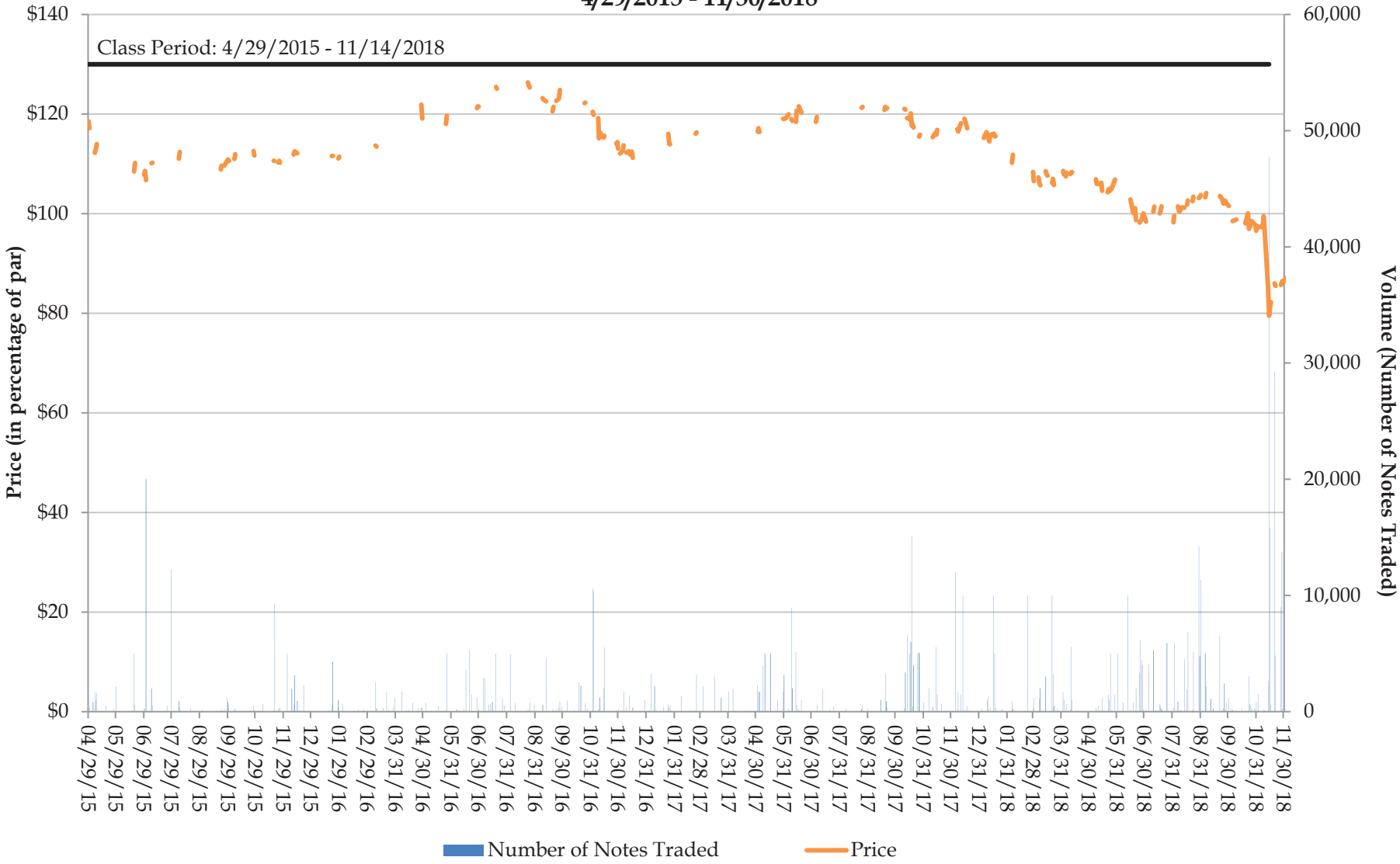


Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 15
PG&E 3.85% Note Price & Volume
CUSIP: 694308HE0
4/29/2015 - 11/30/2018

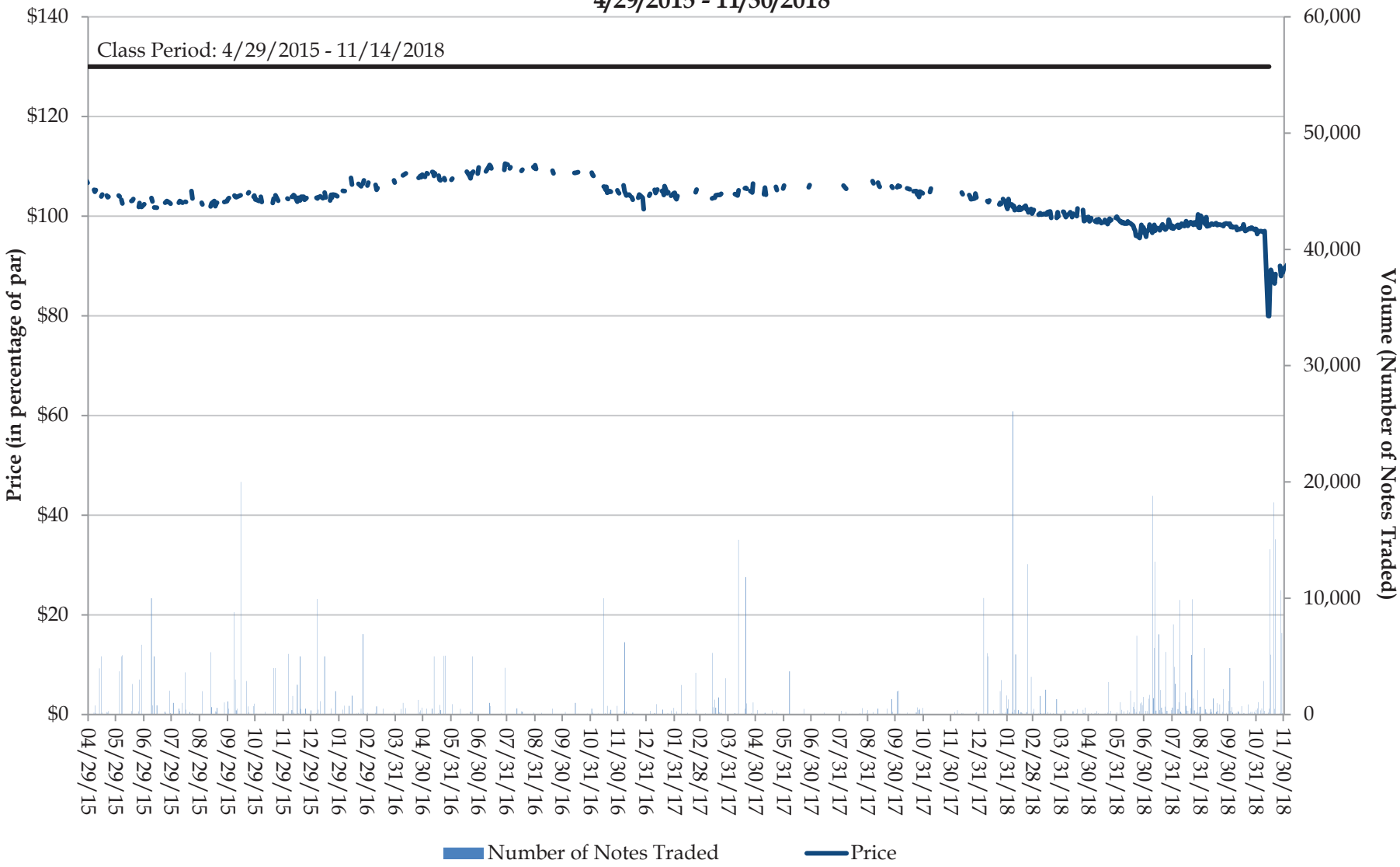
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 16
PG&E 5.125% Note Price & Volume
CUSIP: 694308HF7
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 17
PG&E 3.75% Note Price & Volume
CUSIP: 694308HG5
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

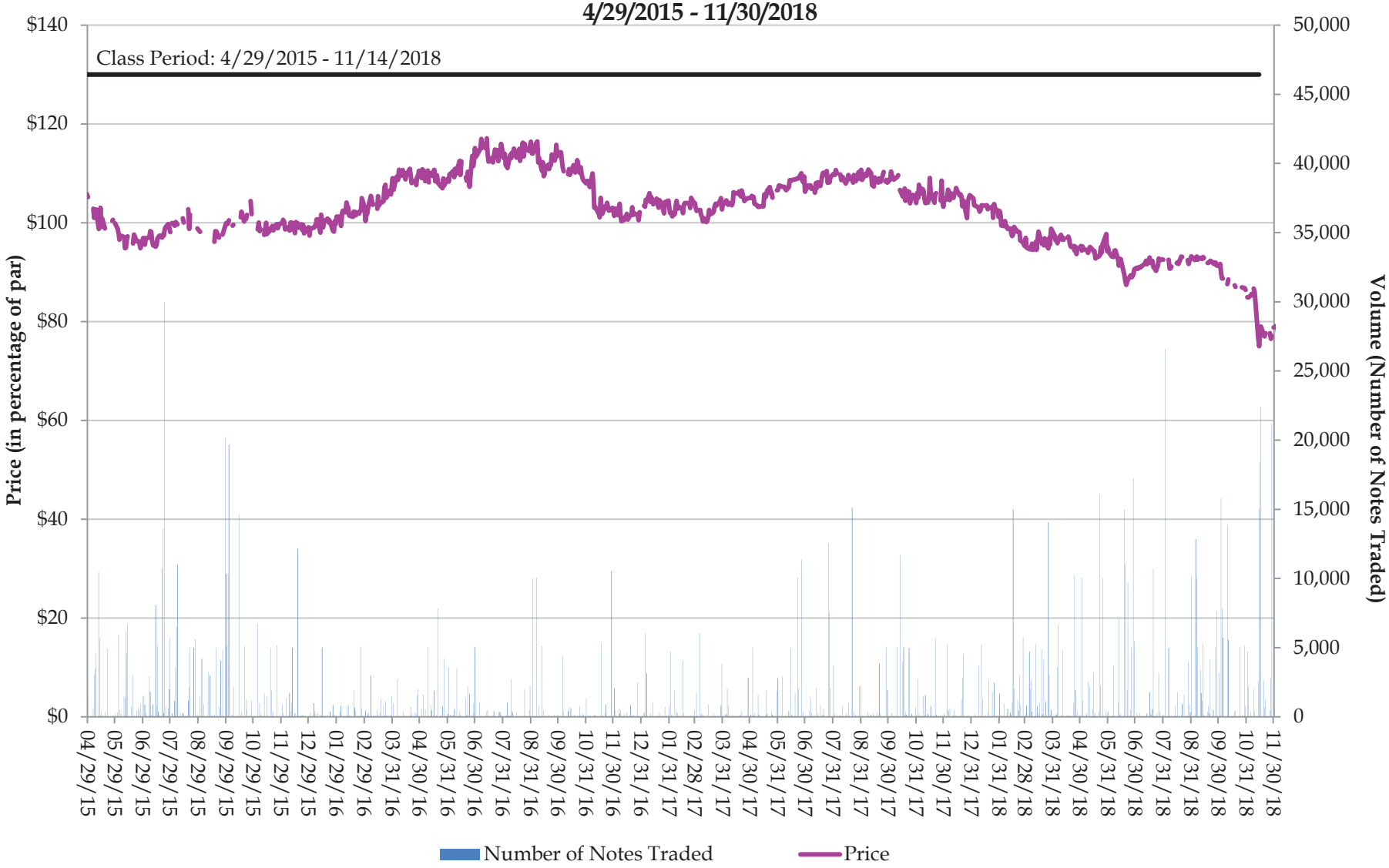
Exhibit 15 - 18
PG&E 4.75% Note Price & Volume
CUSIP: 694308HH3
4/29/2015 - 11/30/2018

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 19
PG&E 3.40% Note Price & Volume
CUSIP: 694308HK6
4/29/2015 - 11/30/2018

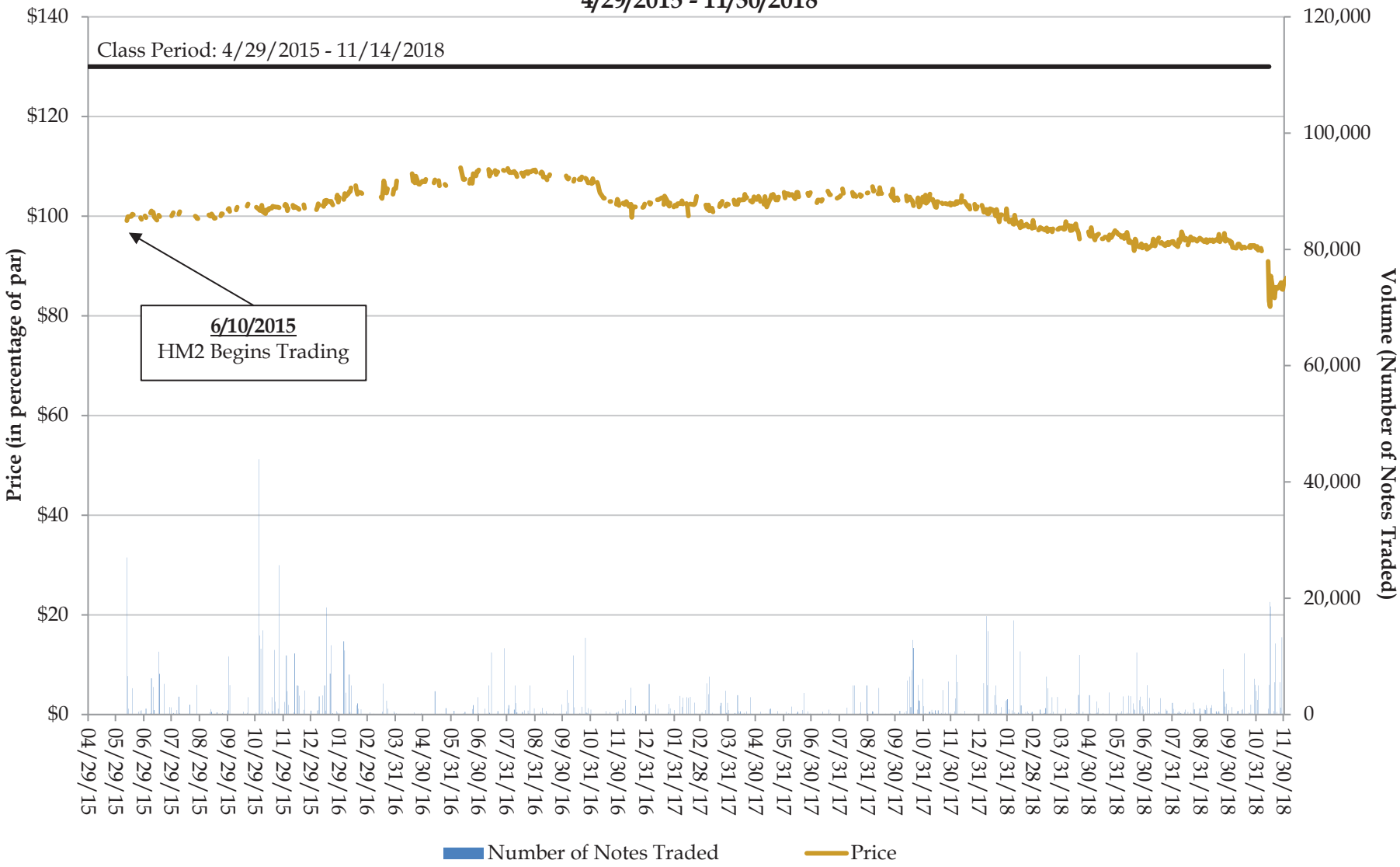
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 20
PG&E 4.30% Note Price & Volume
CUSIP: 694308HL4
4/29/2015 - 11/30/2018



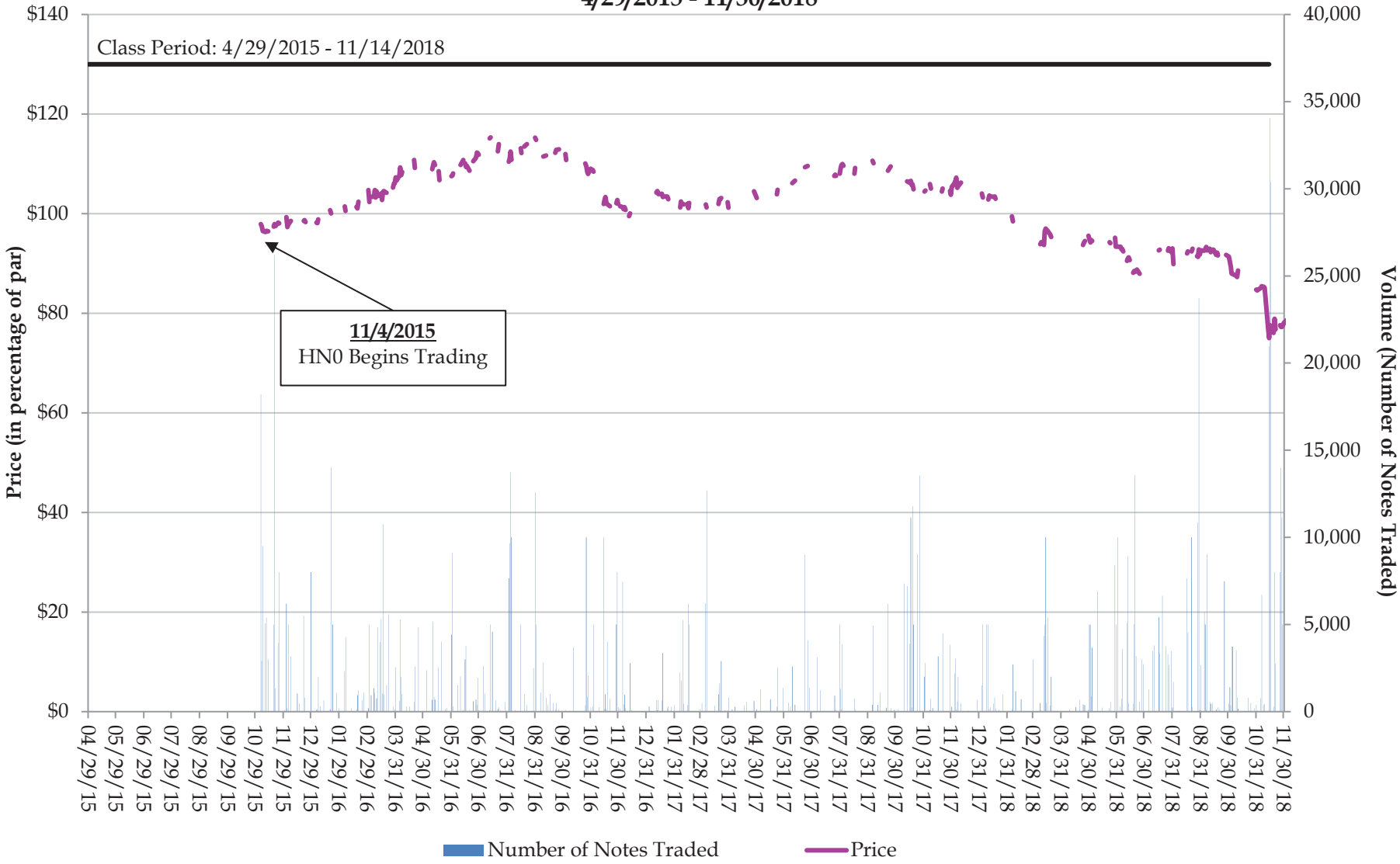
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 21
PG&E 3.50% Note Price & Volume
CUSIP: 694308HM2
4/29/2015 - 11/30/2018



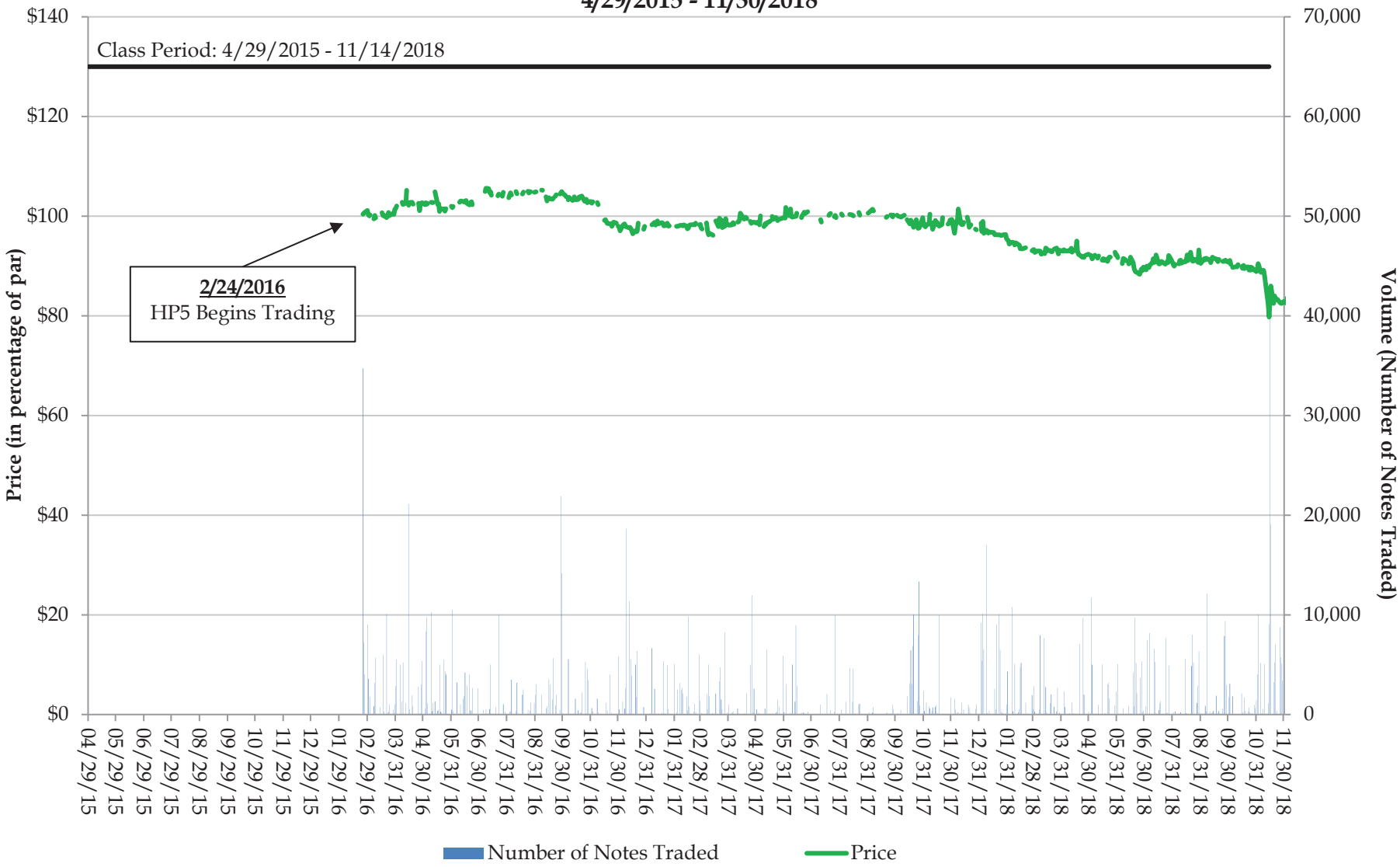
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 22
PG&E 4.25% Note Price & Volume
CUSIP: 694308HN0
4/29/2015 - 11/30/2018



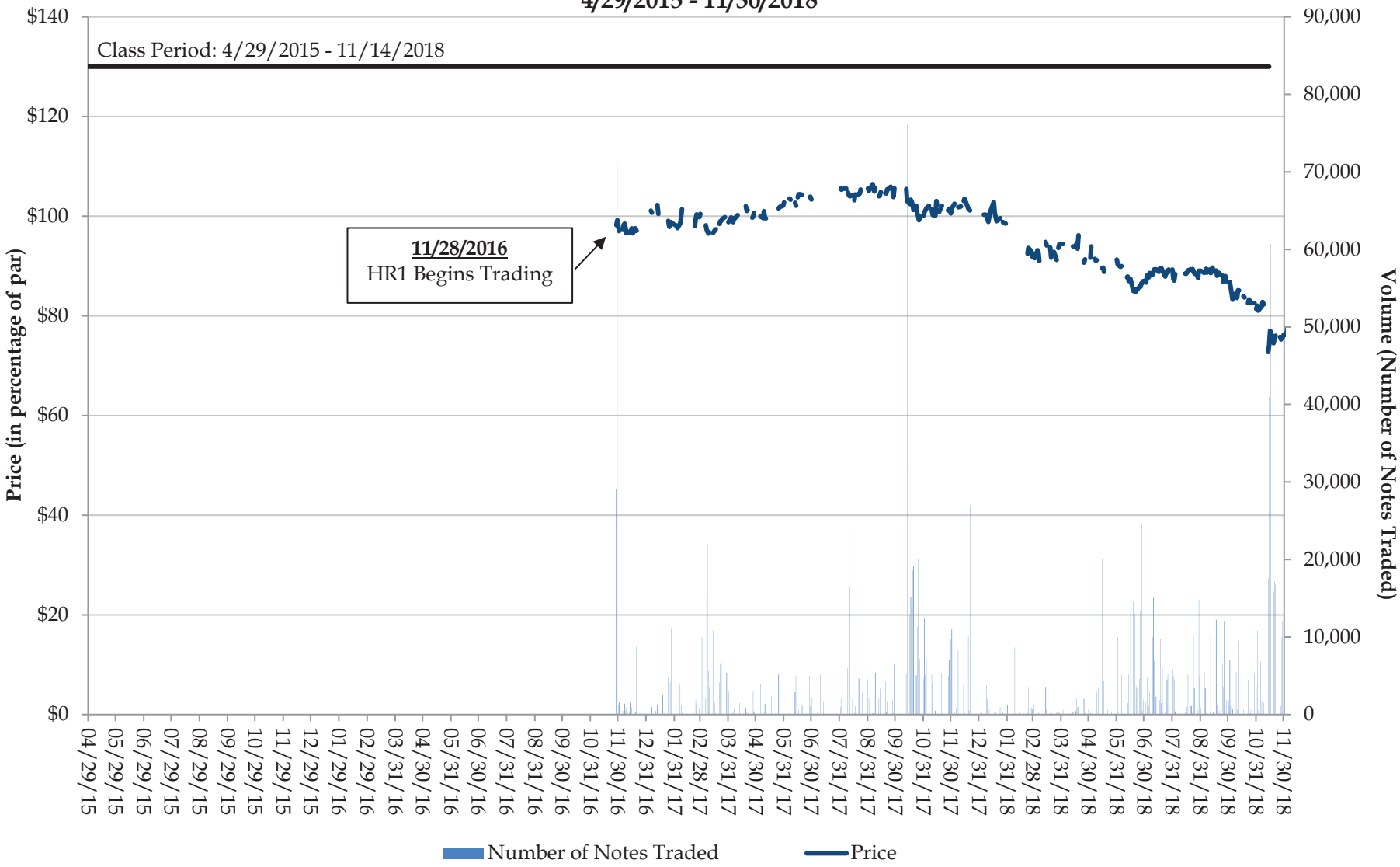
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 23
PG&E 2.95% Note Price & Volume
CUSIP: 694308HP5
4/29/2015 - 11/30/2018



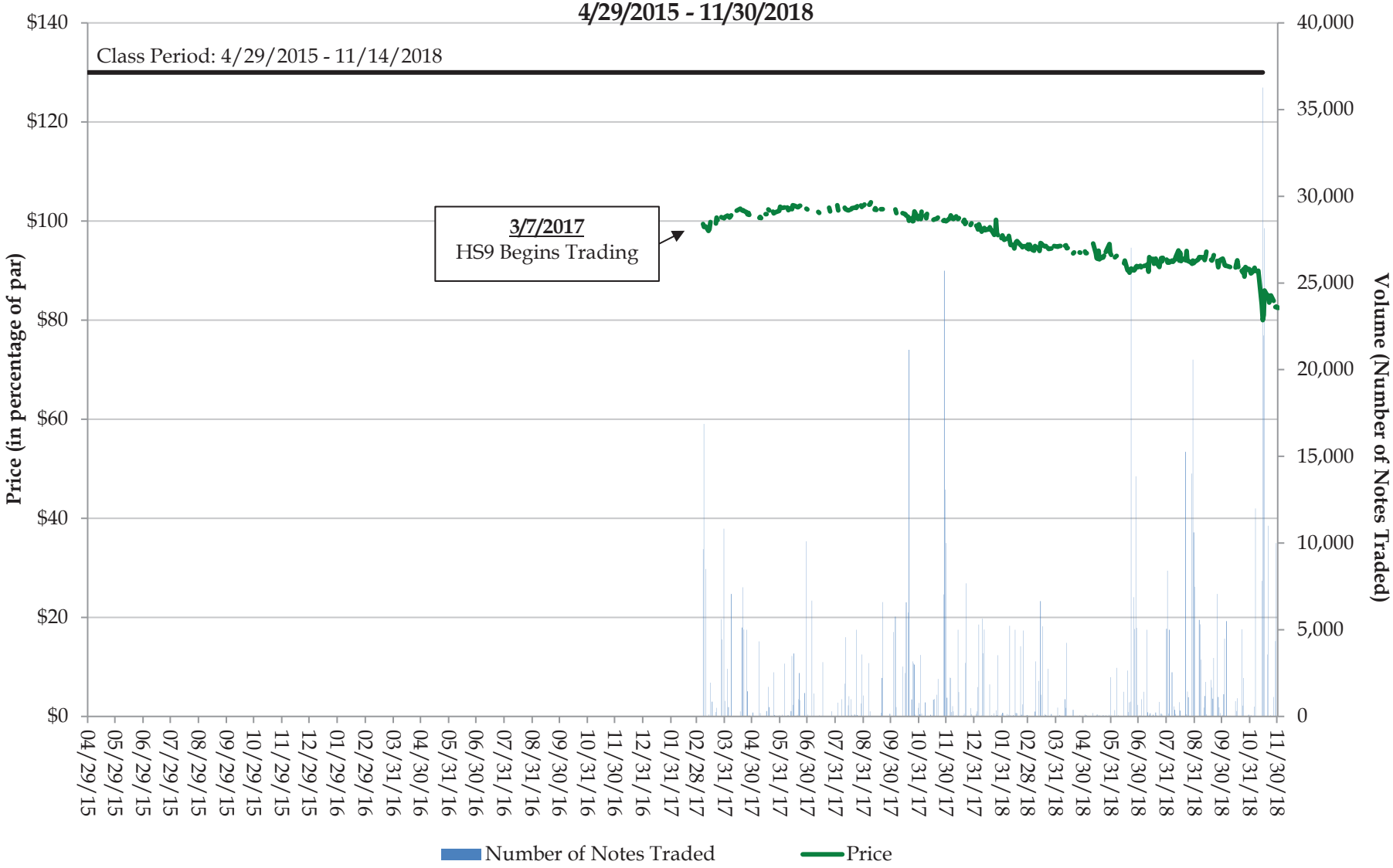
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 24
PG&E 4.00% Note Price & Volume
CUSIP: 694308HR1
4/29/2015 - 11/30/2018



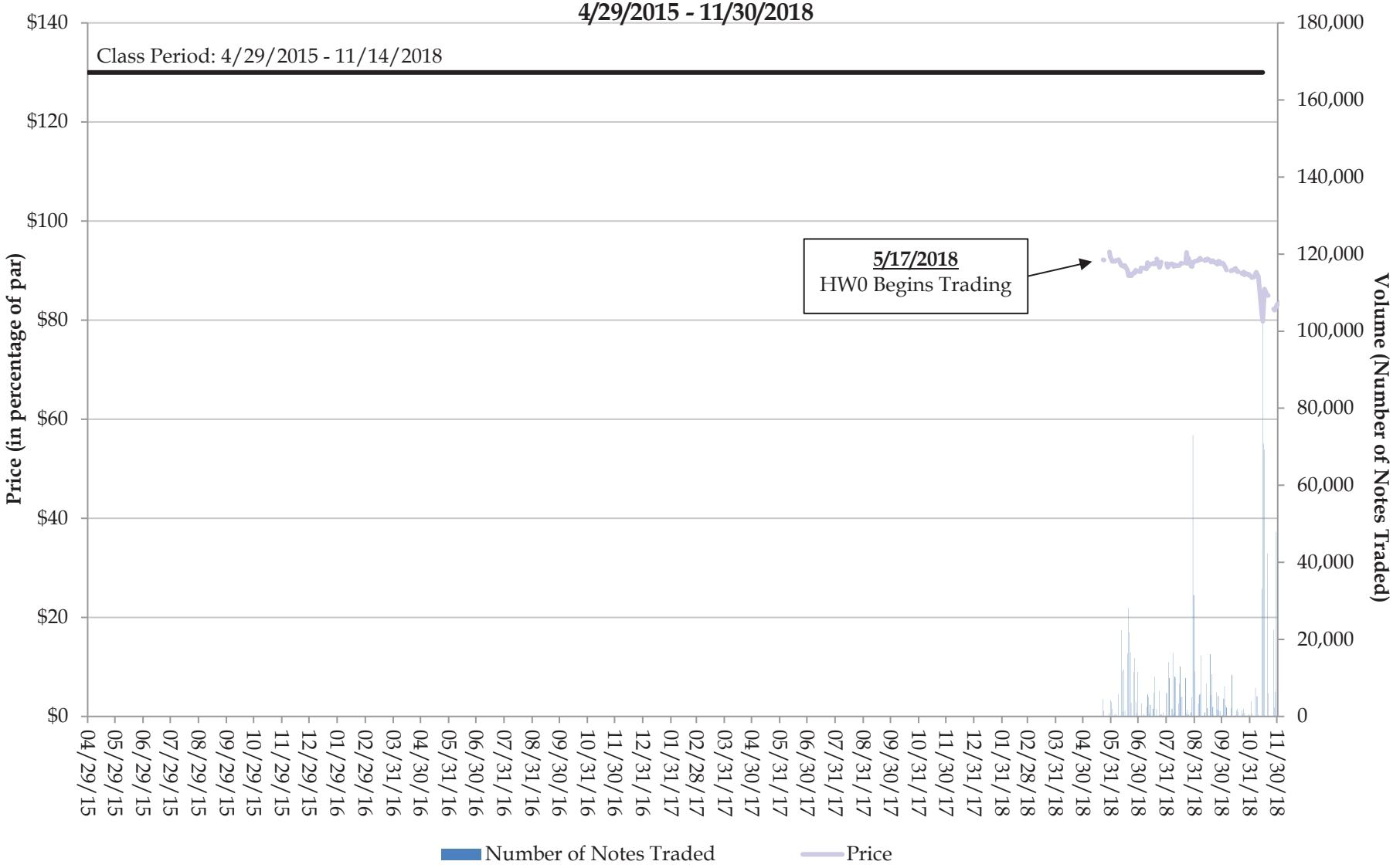
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 25
PG&E 3.30% Note Price & Volume
CUSIP: 694308HS9
4/29/2015 - 11/30/2018



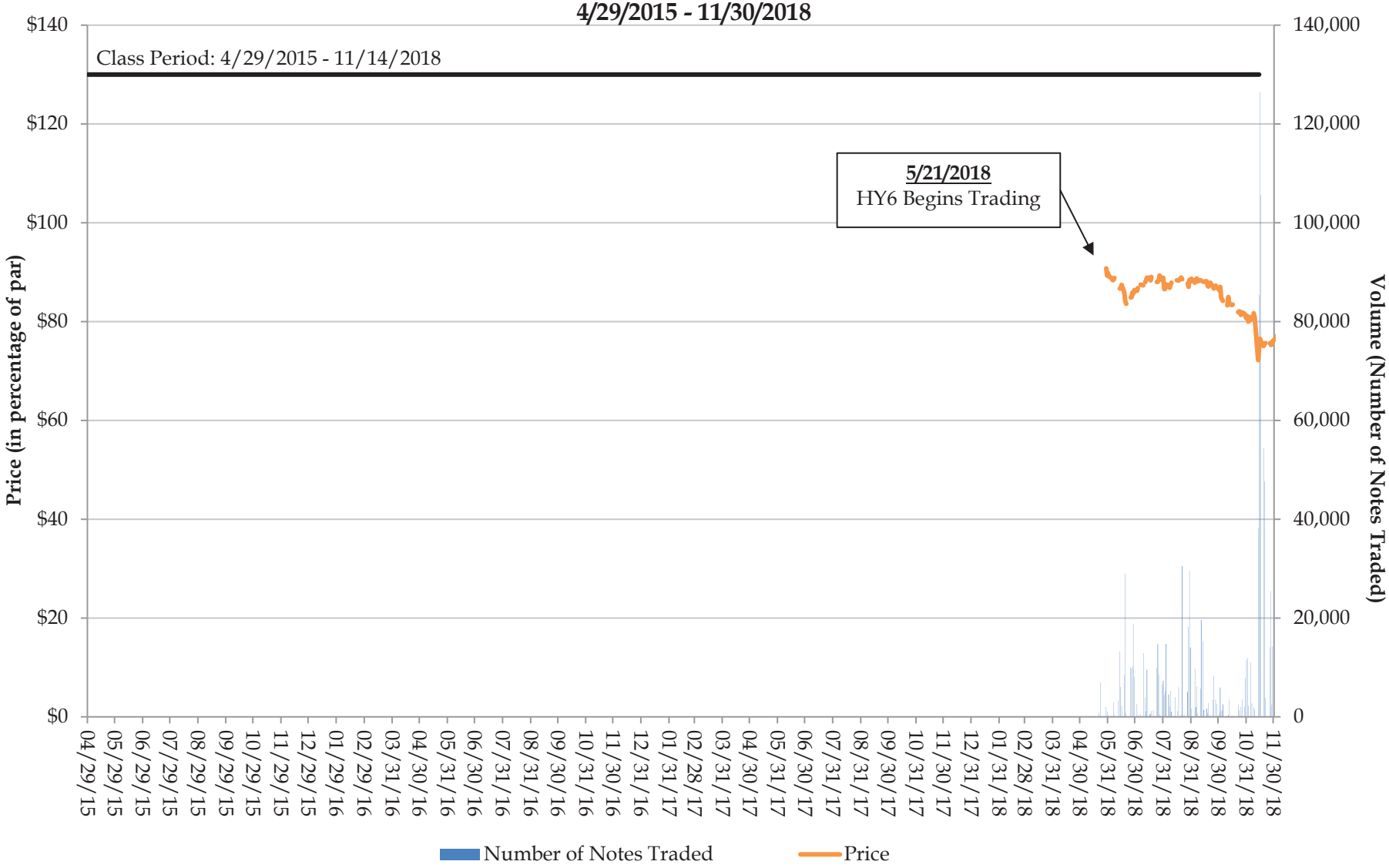
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 26
PG&E 3.30% Note Price & Volume
CUSIP: 694308HW0
4/29/2015 - 11/30/2018



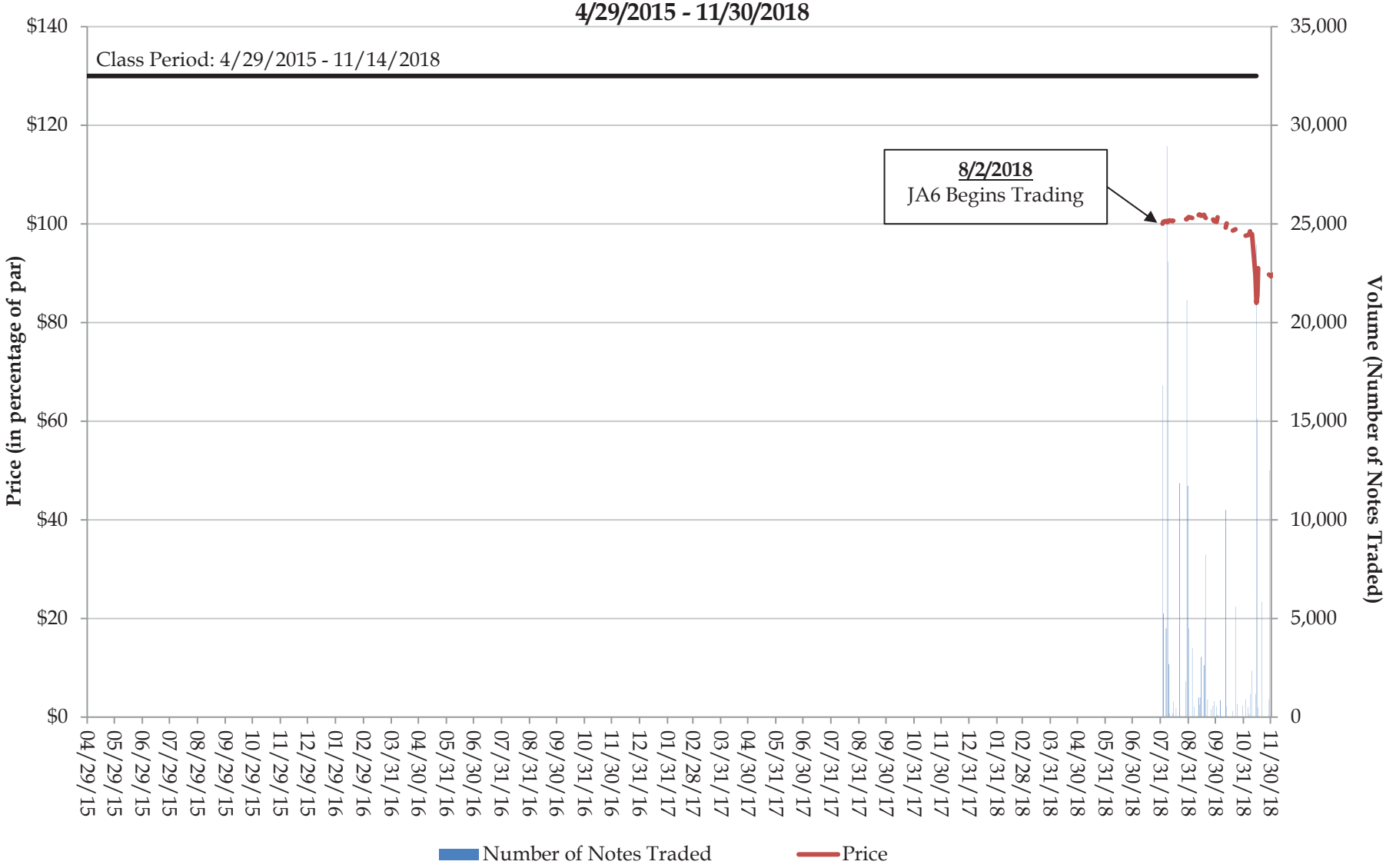
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 27
PG&E 3.95% Note Price & Volume
CUSIP: 694308HY6
4/29/2015 - 11/30/2018



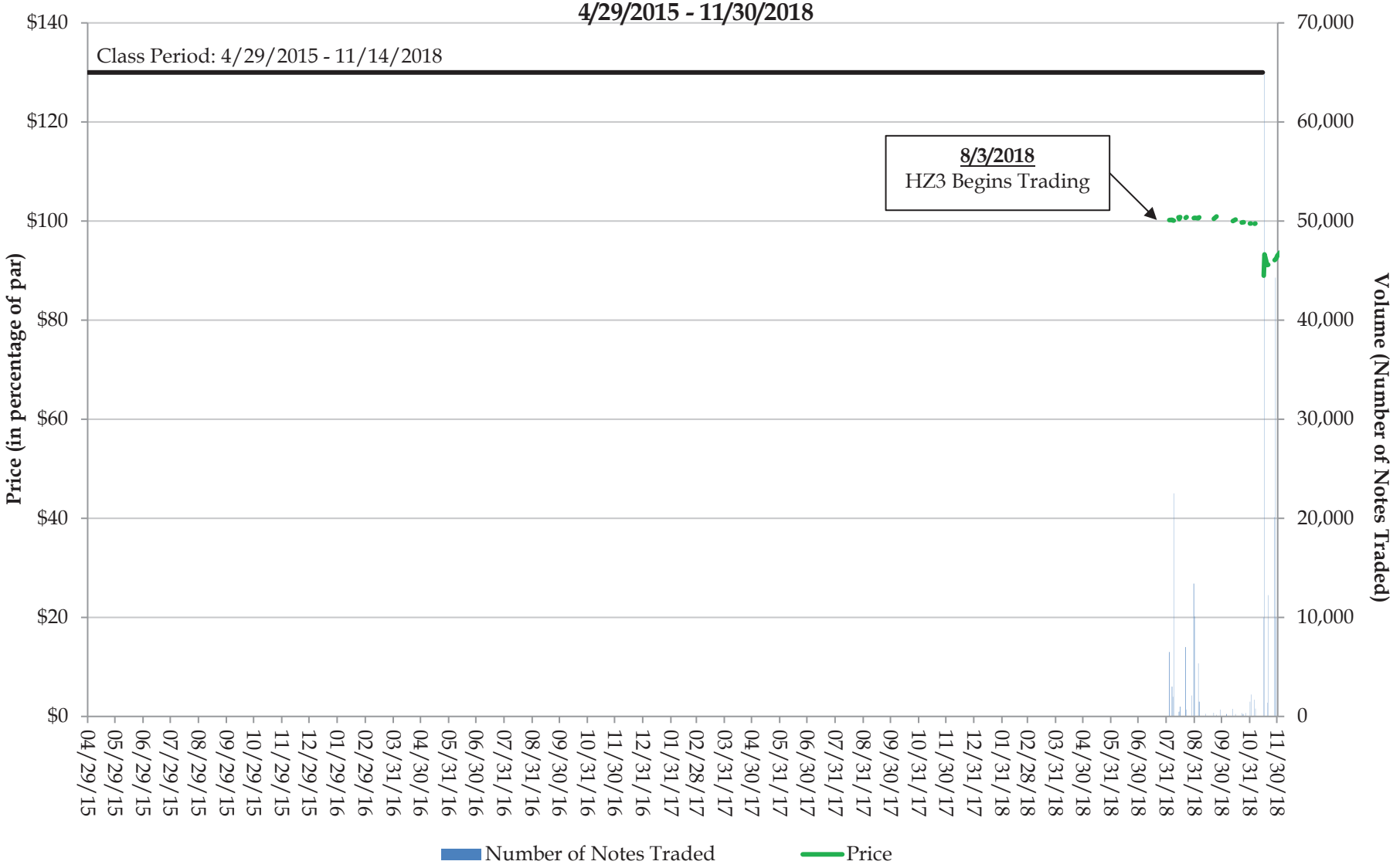
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 28
PG&E 4.65% Note Price & Volume
CUSIP: 694308JA6
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 15 - 29
PG&E 4.25% Note Price & Volume
CUSIP: 694308HZ3
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 16
Summary of Efficiency Factors for PG&E Notes

Factor	Summary of Factor	PG&E Notes
Average Weekly Trading Volume Cammer I	"Turnover measured by average weekly trading of 2% or more of the outstanding shares would justify a strong presumption that the market for a security is an efficient one; 1% would justify a substantial presumption."	• The average weekly trading volume of between 0.26% and 4.91%, as a percentage of notes outstanding for the relevant Notes falls within the range of the bonds in the Hotchkiss and Ronen study.
Analyst Coverage Cammer II	"…it would be persuasive to allege a significant number of securities analysts followed and reported on a company's stock during the class period. The existence of such analysts would imply, for example, the [auditor] reports were closely reviewed by investment professionals, who would in turn make buy/sell recommendations to client investors."	• During the Class Period, at least 16 securities analysts issued 473 analyst reports which implies that important information relevant to trading PG&E Notes was widely communicated to the market.
Market Makers Cammer III	"For over the counter markets without volume reporting, the number of market makers is probably the best single criterion. Ten market makers for a security would justify a substantial presumption that the market for the security is an efficient one; five market makers would justify a more modest presumption."	• PG&E Notes trading volume was reported by TRACE throughout the Relevant Period.
SEC Form S-3 Eligibility Cammer IV	"It would be helpful to allege the Company was entitled to file an S-3 Registration Statement in connection with public offerings or, if ineligible, such ineligibility was only because of timing factors rather than because the minimum stock requirements set forth in the instructions to Form S-3 were not met. Again, it is the number of shares traded and value of shares outstanding that involve the facts which imply efficiency."	• PG&E filed a Form S-3ASR, a Form S-3, and a Form S-3/A during the Class Period (on February 18, 2016, January 4, 2017, and January 19, 2017, respectively). I have found no evidence to believe that PG&E was not S-3 eligible throughout the Class Period, thus satisfying this factor.
Price Reaction to New Information Cammer V	"…one of the most convincing ways to demonstrate [market] efficiency would be to illustrate, over time, a cause and effect relationship between company disclosures and resulting movements in stock price."	• The event study demonstrates a clear cause and effect relationship. The statistical tests show a significant contemporaneous relationship between new firm-specific news and significant changes in the market price of the PG&E Notes.
Market Capitalization	Firms with a larger market capitalization tend to have "larger institutional ownership and tend to be listed on the New York Stock Exchange with a greater analyst following."	• The PG&E Notes had an average outstanding market value of between $257 million and $3,707 million, in terms of notional value, during the Class Period. This value is similar to the median issue size of corporate bonds included in the Hotchkiss and Ronen study that concluded bond prices react as quickly as stock prices to new firm-specific information.
Bid-Ask Spread	The bid-ask spread represents a measure of the cost to transact in a market. Narrow bid-ask spreads indicate less uncertainty regarding valuation and that reasonably sized trades will not substantially impact the market price. Wider bid-ask spreads indicate greater liquidity costs and less ability to trade without moving the market price.	• The bid-ask spreads for PG&E Notes are between the 61st and 91st percentile when compared against the bid-ask spread of 100 randomly selected stocks from the NYSE and NASDAQ. This demonstrates the PG&E Notes do not have abnormally high bid-ask spreads even compared to common stocks
Institutional Holdings	Institutional investors are considered to be sophisticated, well-informed investors with access to most publicly available information for the stocks that they own.	• Institutions held, on average, over 48% of the outstanding PG&E Notes during the Class Period, which further supports the finding that PG&E Notes traded in an efficient market.
Autocorrelation	If autocorrelation is persistent and sufficiently large that a trader could profit from taking advantage of the autocorrelation, it suggests market inefficiency because past price movements are not fully reflected in the current price.	• While there is some evidence of autocorrelation in certain PG&E Notes, it is sufficiently small that it does not suggest an arbitrage opportunity and therefore does not provide evidence of inefficiency

Exhibit 17
Average Weekly Turnover for Notes in the Hotchkiss and Ronen Study

	Company Name	Coupon	Maturity	Amount Issued ($000s)[1]	Average Daily Volume ($000s)	Average Weekly Volume ($000s)	Average Weekly Turnover
1	Grand Union	12.000	9/1/2004	$595,476	$8,038	$40,190	6.75%
2	Stone Container Corp	9.875	2/1/2001	$710,000	$9,371	$46,855	6.60%
3	Trump Plaza Funding	10.875	6/15/2001	$330,000	$3,722	$18,610	5.64%
4	US Air Inc	10.000	7/1/2003	$300,000	$3,272	$16,360	5.45%
	PG&E "JA6"	4.650	8/1/2028	$300,000	$2,947	$14,736	4.91%
5	Stone Container Corp	10.750	4/1/2002	$200,000	$1,819	$9,095	4.55%
6	AK Steel Corp	10.750	4/1/2004	$325,000	$2,753	$13,765	4.24%
7	American Standard	0,10.5	6/1/2005	$750,651	$6,102	$30,510	4.06%
8	Grand Union	11.250	7/15/2000	$350,000	$2,661	$13,305	3.80%
9	Flagstar Corp	11.250	11/1/2004	$722,411	$5,275	$26,375	3.65%
10	Owens Illinois Inc	11.000	12/1/2003	$1,000,000	$7,154	$35,770	3.58%
11	Viacom Intl	8.000	7/7/2006	$1,071,800	$7,494	$37,470	3.50%
12	Flagstar	10.750	9/15/2001	$270,000	$1,876	$9,380	3.47%
13	Penn Traffic	8.625	12/15/2003	$200,000	$1,295	$6,475	3.24%
	PG&E "HY6"	3.950	12/1/2047	$849,800	$5,301	$26,503	3.12%
14	Revlon Worldwide	0.000	3/15/1998	$1,115,760	$6,827	$34,135	3.06%
15	American Standard	9.875	6/1/2001	$200,000	$1,218	$6,090	3.05%
16	Playtex Family	9.000	12/15/2003	$360,000	$2,167	$10,835	3.01%
17	Bally's Health & Tennis	13.000	1/15/2003	$200,000	$1,165	$5,825	2.91%
	PG&E "HW0"	3.300	12/1/2027	$1,129,736	$6,358	$31,788	2.81%
18	Payless Cashways	9.125	4/15/2003	$200,000	$1,097	$5,485	2.74%
	PG&E "HR1"	4.000	12/1/2046	$400,000	$2,803	$14,014	2.53%
19	Southland	5.000	12/15/2003	$450,614	$2,229	$11,145	2.47%
20	Pathmark Stores	9.625	5/1/2003	$438,800	$2,076	$10,380	2.37%
21	NL Industries	11.750	10/15/2003	$250,000	$1,175	$5,875	2.35%
22	Del Webb	9.750	3/1/2003	$100,000	$466	$2,330	2.33%
23	Nextel Comms Corp	11.500	9/1/2003	$525,855	$2,304	$11,520	2.19%
24	Service Merchandise	9.000	12/15/2004	$300,000	$1,298	$6,490	2.16%
25	Fort Howard Corp	10.000	3/15/2003	$300,000	$1,279	$6,395	2.13%
	PG&E "HS9"	3.300	3/15/2027	$400,000	$1,640	$8,198	2.05%
26	Fort Howard Corp	9.000	2/1/2006	$650,000	$2,634	$13,170	2.03%
27	Century Communications	9.750	2/15/2002	$200,000	$706	$3,530	1.77%
28	Nextel Comms Corp	9.750	8/15/2004	$1,126,435	$3,945	$19,725	1.75%
29	Bethlehem Steel	10.375	9/1/2003	$105,000	$365	$1,825	1.74%
30	Continental Cable	8.875	9/15/2005	$275,000	$940	$4,700	1.71%
31	Penn Traffic	10.250	2/15/2002	$125,000	$417	$2,085	1.67%
32	Tenet Healthcare	10.125	3/1/2005	$900,000	$2,982	$14,910	1.66%
33	Wheeling Pittsburgh Corp	9.375	11/15/2003	$325,000	$1,048	$5,240	1.61%
34	Comcast Corp	9.500	1/15/2008	$200,000	$584	$2,920	1.46%
35	OrNda	12.250	5/15/2002	$400,000	$1,150	$5,750	1.44%
	PG&E "HN0"	4.250	3/15/2046	$450,000	$1,254	$6,269	1.39%
	PG&E "HP5"	2.950	3/1/2026	$600,000	$1,632	$8,162	1.36%
36	Cablevision Systems	10.750	4/1/2004	$275,000	$735	$3,675	1.34%
	PG&E "HZ3"	4.250	8/1/2023	$500,000	$1,216	$6,079	1.22%
	PG&E "HL4"	4.300	3/15/2045	$500,000	$1,392	$6,961	1.17%
	PG&E "HM2"	3.500	6/15/2025	$400,000	$1,161	$5,807	1.06%
37	K-lll Comms Corp	10.625	5/1/2002	$250,000	$509	$2,545	1.02%
	PG&E "HH3"	4.750	2/15/2044	$675,000	$1,283	$6,413	0.95%
38	Kroger Co	8.500	6/15/2003	$200,000	$366	$1,830	0.92%
39	Unisys Corp	10.625	10/1/1999	$400,000	$720	$3,600	0.90%
40	Best Buy Co	8.625	10/1/2000	$150,000	$265	$1,325	0.88%
41	Marvel Parnt Hld	0.000	4/15/1998	$251,678	$428	$2,140	0.85%
42	Chiquita Brands	9.625	1/15/2004	$250,000	$424	$2,120	0.85%
	PG&E "GE1"	6.050	3/1/2034	$3,000,000	$4,848	$24,238	0.81%
	PG&E "HK6"	3.400	8/15/2024	$350,000	$553	$2,766	0.79%
	PG&E "HC4"	3.250	6/15/2023	$375,000	$580	$2,900	0.77%
	PG&E "HF7"	5.125	11/15/2043	$500,000	$700	$3,500	0.70%
43	Owens Illinois Inc	10.250	4/1/1999	$250,000	$350	$1,750	0.70%
	PG&E "HG5"	3.750	2/15/2024	$450,000	$623	$3,113	0.69%
44	Comcast Corp	10.625	7/15/2012	$300,000	$394	$1,970	0.66%
	PG&E "GW1"	3.250	9/15/2021	$250,000	$323	$1,617	0.65%
	PG&E "GJ0"	5.800	3/1/2037	$950,000	$1,216	$6,081	0.64%
	PG&E "GZ4"	4.450	4/15/2042	$400,000	$502	$2,508	0.63%
	PG&E "GT8"	3.500	10/1/2020	$800,000	$971	$4,853	0.61%
	PG&E "HE0"	3.850	11/15/2023	$300,000	$352	$1,762	0.59%
	PG&E "HB6"	2.450	8/15/2022	$400,000	$451	$2,253	0.56%
45	Eckerd Corp	9.250	2/15/2004	$300,000	$318	$1,590	0.53%
	PG&E "GS0"	5.400	1/15/2040	$800,000	$815	$4,077	0.51%
	PG&E "HA8"	3.750	8/15/2042	$350,000	$342	$1,709	0.49%
46	Clark Oil & Refining	9.500	9/15/2004	$175,000	$143	$715	0.41%
	PG&E "HD2"	4.600	6/15/2043	$375,000	$300	$1,502	0.40%
	PG&E "GY7"	4.500	12/15/2041	$250,000	$196	$982	0.39%
	PG&E "GV3"	4.250	5/15/2021	$300,000	$228	$1,140	0.38%
47	Trans World Airlines	10.000	11/3/1998	$225,318	$165	$825	0.37%
	PG&E "GQ4"	6.250	3/1/2039	$550,000	$381	$1,904	0.35%
48	Coltec Inds	10.250	4/1/2002	$250,000	$171	$855	0.34%
49	Container Corp	9.750	4/15/2003	$500,000	$297	$1,485	0.30%
	PG&E "GM3"	6.350	2/15/2038	$400,000	$211	$1,055	0.26%
50	Fort Howard Corp	9.250	3/15/2001	$450,000	$237	$1,185	0.26%
51	Healthtrust	8.750	3/15/2005	$300,000	$158	$790	0.26%
52	Safeway Inc	9.660	1/15/2004	$300,000	$153	$765	0.26%
53	Transco Energy Corp	9.375	8/15/2001	$150,000	$37	$185	0.12%
54	Kroger Co	9.750	2/15/2004	$175,000	$32	$160	0.09%
55	Food 4 Less	10.450	4/15/2000	$175,000	$6	$30	0.02%
		Average Issue Size		**$379,996**			
		Median Issue Size		**$300,000**			

Simple Average for All Notes in the Hotchkiss and Ronen Study	**2.13%**
Weighted Average for All Notes in the Hotchkiss and Ronen Study	**2.51%**
Simple Average for PG&E Notes	**1.13%**
Weighted Average for PG&E Notes	**1.15%**

Sources: LSEG Workspace (previously Eikon); Bloomberg; Edith S. Hotchkiss and Tavy Ronen, "The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis," The Review of Financial Studies, 15, No. 5 (2002).
Notes:
(1) Amount issued is the total $ value issued for this note.
(2) Average weekly trading volume and average weekly turnover for the PG&E Notes is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data or issuance through November 14, 2018. If the last "trading week" during the Class Period has fewer than 5 market days, it is excluded from the analysis since it is not a full week.

Exhibit 18
Trade Distribution by Frequency

This table presents statistics for the distribution of issues by frequency of trade, of US corporate dollar denominated bonds in the State Street Corporation custody trades database during the period from January 2003 to December 2005. The frequency of trading of an issue is defined as the number of distinct trading days in a given year. The data show the number of issues corresponding to a particular trading frequency in each year. For example, in 2003, five issues traded more than 200 days and 42 issues traded between 150 and 200 days (Mahanti et al., p. 279).

Frequency of trading - Days	2003	2004	2005
> 200 days in year	5	3	6
150–200 days in year	42	25	14
100–150 days in year	146	149	116
50–100 days in year	786	730	739
30–50 days in year	940	1007	961
10–30 days in year	2439	2722	2672
5–10 days in year	1754	1742	1580
At least 1 day and at most 5 days in year	5006	4786	4335
No trade in year	8262	8397	8693
Total issues	19380	19561	19116

Frequency of trading - Percentage	2003	2004	2005
> 200 days in year	0.03%	0.02%	0.03%
150–200 days in year	0.22%	0.13%	0.07%
100–150 days in year	0.75%	0.76%	0.61%
50–100 days in year	4.06%	3.73%	3.87%
30–50 days in year	4.85%	5.15%	5.03%
10–30 days in year	12.59%	13.92%	13.98%
5–10 days in year	9.05%	8.91%	8.27%
At least 1 day and at most 5 days in year	25.83%	24.47%	22.68%
No trade in year	42.63%	42.93%	45.47%
Total	100.00%	100.00%	100.00%

PG&E Notes - Frequency of Trading Days

Note	Annualized Dates Notes Traded	Time Period
GE1	232	4/29/2015 - 11/14/2018
GJ0	144	4/29/2015 - 11/14/2018
GM3	40	4/29/2015 - 11/14/2018
GQ4	56	4/29/2015 - 11/14/2018
GS0	130	4/29/2015 - 11/14/2018
GT8	152	4/29/2015 - 11/14/2018
GV3	106	4/29/2015 - 11/14/2018
GW1	104	4/29/2015 - 11/14/2018
GY7	55	4/29/2015 - 11/14/2018
GZ4	93	4/29/2015 - 11/14/2018
HA8	71	4/29/2015 - 11/14/2018
HB6	125	4/29/2015 - 11/14/2018
HC4	130	4/29/2015 - 11/14/2018
HD2	71	4/29/2015 - 11/14/2018
HE0	138	4/29/2015 - 11/14/2018
HF7	94	4/29/2015 - 11/14/2018
HG5	149	4/29/2015 - 11/14/2018
HH3	144	4/29/2015 - 11/14/2018
HK6	121	4/29/2015 - 11/14/2018
HL4	231	4/29/2015 - 11/14/2018
HM2	188	6/10/2015 - 11/14/2018
HN0	122	11/4/2015 - 11/14/2018
HP5	202	2/24/2016 - 11/14/2018
HR1	170	11/28/2016 - 11/14/2018
HS9	192	3/7/2017 - 11/14/2018
HW0	222	5/17/2018 - 11/14/2018
HY6	205	5/21/2018 - 11/14/2018
JA6	153	8/2/2018 - 11/14/2018
HZ3	106	8/3/2018 - 11/14/2018

Sources: LSEG Workspace (previously Eikon); Sriketani Mahanti, Amrut Nashikkar, Marti Subrahmanyam, George Chacko & Gaurav Mallik, "Latent liquidity: A new measure of liquidity, with an application to corporate bonds," *Journal of Financial Economics,* Volume 88, Issue 2, pp. 272-98 (May 2008).

Notes:
(1) PG&E Notes are annualized based on 250 bond trading days in a year.
(2) Highlighting reflects where PG&E Notes fall in the table.

Exhibit 19
Percentile Distribution of Trades by Time Elapsed Between Successive Trades

This table presents the distribution of time elapsed between trades (in days) of trades in dollar-denominated US corporate bonds in the State Street Corporation custody trades database during the period from January 2003 to December 2005. The time elapsed is defined as the number of days between successive trades of a given bond. Bonds that trade in a given year are sorted in the order of increasing time elapsed and the decile cutoff values are computed. The values shown are the average time elapsed of the bond for the given percentile range. For example, the data shows that the median trade had an elapsed time of 13 days in 2003 between successive trades and 12 days in 2005 (Mahanti et al., p. 282).

Percentile	2003	2004	2005
10	1	1	1
20	2	2	2
30	4	4	4
40	7	8	8
50	13	13	12
60	24	23	21
70	42	40	39
80	82	79	78
90	184	187	188

Average Days Elapsed Between Successive Trades for PG&E Notes

Note	Time Period	Average Days
GE1	4/29/2015 - 11/14/2018	1.1
GJ0	4/29/2015 - 11/14/2018	1.7
GM3	4/29/2015 - 11/14/2018	6.2
GQ4	4/29/2015 - 11/14/2018	4.5
GS0	4/29/2015 - 11/14/2018	1.9
GT8	4/29/2015 - 11/14/2018	1.6
GV3	4/29/2015 - 11/14/2018	2.4
GW1	4/29/2015 - 11/14/2018	2.4
GY7	4/29/2015 - 11/14/2018	4.5
GZ4	4/29/2015 - 11/14/2018	2.7
HA8	4/29/2015 - 11/14/2018	3.5
HB6	4/29/2015 - 11/14/2018	2.0
HC4	4/29/2015 - 11/14/2018	1.9
HD2	4/29/2015 - 11/14/2018	3.6
HE0	4/29/2015 - 11/14/2018	1.8
HF7	4/29/2015 - 11/14/2018	2.7
HG5	4/29/2015 - 11/14/2018	1.7
HH3	4/29/2015 - 11/14/2018	1.7
HK6	4/29/2015 - 11/14/2018	2.1
HL4	4/29/2015 - 11/14/2018	1.1
HM2	6/10/2015 - 11/14/2018	1.3
HN0	11/4/2015 - 11/14/2018	2.1
HP5	2/24/2016 - 11/14/2018	1.2
HR1	11/28/2016 - 11/14/2018	1.5
HS9	3/7/2017 - 11/14/2018	1.3
HW0	5/17/2018 - 11/14/2018	1.1
HY6	5/21/2018 - 11/14/2018	1.2
JA6	8/2/2018 - 11/14/2018	1.7
HZ3	8/3/2018 - 11/14/2018	2.2

Sources: LSEG Workspace (previously Eikon); Sriketani Mahanti, Amrut Nashikkar, Marti Subrahmanyam, George Chacko & Gaurav Mallik, "Latent liquidity: A new measure of liquidity, with an application to corporate bonds," *Journal of Financial Economics,* Volume 88, Issue 2, pp. 272-98 (May 2008).

Note:
(1) Highlighting reflects where PG&E Notes fall in the table.

Exhibit 20
PG&E Notes Regression Summary

				4/29/2015 - 10/17/2017			10/18/2017 - 11/7/2018		
#	Note	Maturity Date	Coupon	Bond Index Coefficient	Bond Index T-Stat	RMSE	Bond Index Coefficient	Bond Index T-Stat	RMSE
1	GE1	12/1/2047	3.950%	1.76	12.15	0.0084	1.86	6.90	0.0082
2	GJ0	12/1/2046	4.000%	1.63	6.06	0.0086	2.29	7.28	0.0071
3	GM3	3/15/2046	4.250%	0.95	0.92	0.0078	2.40	2.23	0.0094
4	GQ4	3/15/2045	4.300%	1.65	1.83	0.0094	1.23	1.32	0.0110
5	GS0	2/15/2044	4.750%	1.66	6.12	0.0076	1.50	3.13	0.0095
6	GT8	11/15/2043	5.125%	0.25	1.48	0.0060	0.01	0.10	0.0035
7	GV3	6/15/2043	4.600%	0.33	1.15	0.0067	0.20	0.79	0.0053
8	GW1	8/15/2042	3.750%	0.34	1.25	0.0057	0.83	3.07	0.0059
9	GY7	4/15/2042	4.450%	1.28	1.45	0.0088	1.14	0.75	0.0128
10	GZ4	12/15/2041	4.500%	2.21	5.08	0.0087	1.70	1.77	0.0116
11	HA8	1/15/2040	5.400%	2.88	4.37	0.0116	1.32	0.64	0.0149
12	HB6	3/1/2039	6.250%	0.54	2.57	0.0057	-0.02	-0.05	0.0075
13	HC4	3/1/2037	5.800%	1.06	3.84	0.0063	0.96	3.37	0.0076
14	HD2	2/15/2038	6.350%	1.75	2.28	0.0088	2.54	2.21	0.0110
15	HE0	8/1/2028	4.650%	0.89	2.81	0.0085	0.02	0.06	0.0092
16	HF7	3/1/2034	6.050%	2.16	7.17	0.0068	1.98	3.54	0.0090
17	HG5	3/15/2027	3.300%	0.68	3.82	0.0057	1.28	4.87	0.0070
18	HH3	12/1/2027	3.300%	2.35	9.78	0.0079	2.09	4.88	0.0087
19	HK6	3/1/2026	2.950%	1.76	3.91	0.0095	0.77	2.31	0.0080
20	HL4	6/15/2025	3.500%	2.08	10.25	0.0117	2.47	7.04	0.0107
21	HM2	8/15/2024	3.400%	0.92	6.25	0.0064	0.90	3.44	0.0076
22	HN0	2/15/2024	3.750%	2.05	8.57	0.0063	1.87	4.14	0.0080
23	HP5	11/15/2023	3.850%	1.18	7.18	0.0056	1.46	5.28	0.0078
24	HR1	8/1/2023	4.250%	2.09	6.61	0.0060	2.75	7.85	0.0080
25	HS9	6/15/2023	3.250%	1.17	4.12	0.0039	0.63	1.91	0.0085
26	HY6	8/15/2022	2.450%	N/A	N/A	N/A	2.83	7.68	0.0064
27	HW0	9/15/2021	3.250%	N/A	N/A	N/A	1.23	3.86	0.0059
28	JA6	5/15/2021	4.250%	N/A	N/A	N/A	1.17	3.21	0.0030
29	HZ3	10/1/2020	3.500%	N/A	N/A	N/A	0.37	1.15	0.0019

Sources: LSEG Workspace (previously Eikon), S&P Capital IQ, and Factiva

Notes:

(1) The results are based on two fixed regressions, the first window from 4/29/2015 - 10/17/2017 and the second window from 10/18/2017 - 11/7/2018 (prior to the beginning of the Camp Fire). The regression model controls for a broad market index (ICE BofA US Corporate Total Return Index). Earnings announcements, the alleged corrective disclosure dates, and two outlier dates have been removed from estimation (i.e., 10/16/2017: statistically significant follow-on to alleged corrective disclosure, and 10/17/2017: statistically significant day where news spread of suspected wildfire arsonist arrested in California).

(2) Notes ending in "HY6", "JA6", "HW0", and "HZ3" do not start trading until after 10/17/2017

Exhibit 21
Summary of News on the Top Ten Days

				Common Stock Event Study Results					
#	Market Date	Common Stock Closing Price	Common Stock Raw Return	Abnormal Return	Abnormal Dollar Change	t-Stat	P-Value	Sig Level	Events
1	11/14/2018	$25.59	-21.79%	-21.09%	-$6.90	-14.81	0.00	***	PG&E revealed that the Company's revolving credit facilities were fully drawn and that the liability for the Camp Fire could exceed its insurance. - *See* PG&E SEC Form 8-K filed on November 13, 2018, 5:05 PM; "PG&E plunges 21% amid disclosure of an 'electric incident' just before wildfire," *CNBC*, November 14, 2018, 9:26 AM
2	11/12/2018	$32.98	-17.38%	-16.47%	-$6.57	-11.63	0.00	***	As the Camp Fire continued to rage, the market drew connections to PG&E's equipment, and reports of investigations into PG&E emerged. - *See* "California wildfires: 150,000 evacuated as death toll climbs," *UI-Wire*, November 10, 2018; "10:31 EDT California utility stocks collapse as California wildfire ragesShares...," *Theflyonthewall.com*, November 12, 2018; "15:09 EDT Regulators investigating PG&E, Edison over California fires, Mercury...," *Theflyonthewall.com*, November 12, 2018.
3	11/9/2018	$39.92	-16.49%	-16.28%	-$7.78	-11.53	0.00	***	PG&E announced that the Company would not shut off power lines during potentially dangerous weather conditions, and later filed an Electric Incident Report with the CPUC stating that PG&E had experienced a problem with its Caribou-Palermo high-voltage transmission line in Butte County. - *See* "PG&E Determines to Not Proceed With Public Safety Power Shutoff Planned for Portions of Eight Northern California Counties," *Business Wire*, November 8, 2018, 5:34 PM.; "PG&E reports power line problem in Butte County near time and place where wildfire sparked," *The Sacramento Bee*, November 9, 2018.
4	12/21/2017	$44.50	-12.95%	-12.54%	-$6.41	-9.81	0.00	***	PG&E suspended the dividend of the Common and Preferred Stock. - *See* " PG&E Announces Suspension of Dividend, Citing Uncertainty Related to Causes and Potential Liabilities Associated with Northern California Wildfires," *Business Wire*, December 20, 2017, 5:15 PM.
5	10/13/2017	$57.72	-10.51%	-10.34%	-$6.67	-23.12	0.00	***	The market learned that the CPUC had issued a litigation hold letter to PG&E. - *See* "California regulators tell PG&E to preserve fire evidence," *The San Francisco Chronicle*, October 12, 2017, 10:34 PM.
6	10/16/2017	$53.43	-7.43%	-7.66%	-$4.42	-17.05	0.00	***	The market continued to react to the North Bay fires and PG&E's involvement, and analysts downgraded PG&E. - *See* "PG&E is having worst week in nine years as wildfires rage," *St. Albens Messenger*, October 14, 2017; "PG&E Cut to Buy From Conviction Buy by Goldman Sachs," *Dow Jones Institutional News*, October 16, 2017, 9:41 AM.
7	10/12/2017	$64.50	-6.72%	-7.42%	-$5.13	-16.65	0.00	***	As wildfires spread in the North Bay, the market began to tie it to PG&E. - *See* "PG&E power lines may have provided key spark to North Bay inferno," *San Francisco Business Times Online*, October 12, 2017.
8	10/17/2017	$57.44	7.51%	7.29%	$3.90	16.31	0.00	***	Continued market reaction to PG&E's involvement in North Bay fires as more information is released to the market. - *See* "PG&E DECLINE CONTINUES OVER FEAR OF ROLE IN FIRES; INVESTORS DUMP THE UTILITY'S STOCK AMID STATE REGULATORS' MOVES TOWARD A POSSIBLE INVESTIGATION," *San Jose Mercury News*, October 17, 2017.
9	3/13/2018	$45.10	6.32%	6.47%	$2.75	5.07	0.00	***	California Government announced proposal to address impacts of natural disasters, which could reduce liabilities faced by utility companies. - *See* "PG&E, Edison surge after California to work toward updating liability rules," *Seeking Alpha*, March 13, 2018, 3:42 PM.
10	5/29/2018	$42.34	-5.19%	-5.41%	-$2.41	-4.42	0.00	***	CalFire ruled PG&E was responsible for 4 Northern California wildfires in October of 2017. - *See* "PG&E lines faulted in some wildfires," *The San Francisco Chronicle*, May 26, 2018.

Sources: S&P Capital IQ and Factiva.
Notes:
(1) The results are based on a rolling regression of the previous 120 trading days through October 17, 2017, followed by a fixed-to-rolling regression beginning on October 18, 2017. The fixed-to-rolling regression was conducted to account for the volatility due to the events of the North Bay fires. The regression model controls for a broad market index (S&P 500 Total Return Index) and a Peer Index. The Peer Index is a market capitalization-weighted index consisting of the members of the Dow Jones Utility Average Index during the Class Period, excluding PG&E. Earnings announcements, the alleged corrective disclosure dates, and two outlier dates have been removed from estimation (*i.e.*, 10/16/2017: a day immediately following one of the alleged corrective disclosures with a highly statistically significant return, and 10/17/2017: another highly statistically significant day where news spread of a suspected wildfire arsonist arrested in California).

(2) "***" Denotes statistical significance at the 99% confidence level or greater. "**" Denotes statistical significance at the 95% confidence level or greater. "*" Denotes statistical significance at the 90% confidence level or greater.

Exhibit 22
Comparison of Statistical Significance for All Relevant PG&E Notes on the Top Ten Days vs. Days with Least News During the Class Period

Statistic	Top Ten Days	Days with Least News, No Analyst Reports, and No SEC Filing Dates
N[(1)]	192	771
Significant Days at 95% Confidence Level	66	31
% Significant Days at 95% Confidence Level[(2)]	34.38%	4.02%
Average Absolute Abnormal Return[(3)]	2.60%	0.64%
Average Volume [(4)]	9,132	1,372

Notes:

(1) Results are based on the first date for which I have abnormal return data for each respective note, through the end of the Class Period. For the purposes of this analysis, I selected the days with least news. Days with least news were days that had 5 or fewer news articles via the Factiva database (and not otherwise identified to be material news, as identified in Exhibit 9), and no analyst reports or SEC filings were issued.

(2) 34.38% rate of statistical significance is statistically significantly different than 4.02% at the 99% confidence level using a Chi-Square test.

(3) 2.60% absolute abnormal return is statistically significantly different than 0.64% based on a t-test for difference of means at the 99% confidence level.

(4) The difference between 9,132 and 1,372 is statistically significant at the 99% confidence level. Reported in Number of Notes.

(5) November 14, 2018, November 12, 2018 (November 13, 2018 for the notes as November 12, 2018 is a bond holiday), November 9, 2018, December 21, 2017, October 13, 2017, October 16, 2017, October 12, 2017, October 17, 2017, March 13, 2018, and May 29, 2018 are used in this analysis.

Exhibit 23
PG&E Notes
Market Capitalization During the Class Period

#	PG&E Notes	Description	Average Market Capitalization ($M)
1	GE1	6.05% Note Due 2034	$3,706.83
2	GJ0	5.8% Note Due 2037	$1,150.82
3	GM3	6.35% Note Due 2038	$509.28
4	GQ4	6.25% Note Due 2039	$696.62
5	GS0	5.4% Note Due 2040	$936.95
6	GT8	3.5% Note Due 2020	$831.78
7	GV3	4.25% Note Due 2021	$319.24
8	GW1	3.25% Note Due 2021	$257.39
9	GY7	4.5% Note Due 2041	$259.71
10	GZ4	4.45% Note Due 2042	$416.07
11	HA8	3.75% Note Due 2042	$330.07
12	HB6	2.45% Note Due 2022	$393.28
13	HD2	4.6% Note Due 2043	$397.48
14	HC4	3.25% Note Due 2023	$381.26
15	HF7	5.125% Note Due 2043	$567.20
16	HE0	3.85% Note Due 2023	$314.20
17	HH3	4.75% Note Due 2044	$732.36
18	HG5	3.75% Note Due 2024	$467.89
19	HK6	3.4% Note Due 2024	$356.21
20	HL4	4.3% Note Due 2045	$609.77
21	HM2	3.5% Note Due 2025	$587.49
22	HN0	4.25% Note Due 2046	$459.80
23	HP5	2.95% Note Due 2026	$586.85
24	HR1	4.% Note Due 2046	$550.96
25	HS9	3.3% Note Due 2027	$389.12
26	HW0	3.3% Note Due 2027	$1,025.96
27	HY6	3.95% Note Due 2047	$733.21
28	JA6	4.65% Note Due 2028	$299.81
29	HZ3	4.25% Note Due 2023	$501.75

Source: LSEG Workspace (formerly Eikon)

Exhibit 24
PG&E Notes Bid-Ask Spread During the Class Period

#	PG&E Notes	Description	Average	Median
1	GE1	6.05% Note Due 2034	1.11%	1.08%
2	GJ0	5.8% Note Due 2037	1.55%	1.55%
3	GM3	6.35% Note Due 2038	2.05%	2.06%
4	GQ4	6.25% Note Due 2039	1.91%	1.76%
5	GS0	5.4% Note Due 2040	1.88%	1.86%
6	GT8	3.5% Note Due 2020	0.53%	0.49%
7	GV3	4.25% Note Due 2021	0.68%	0.64%
8	GW1	3.25% Note Due 2021	0.78%	0.80%
9	GY7	4.5% Note Due 2041	1.23%	1.27%
10	GZ4	4.45% Note Due 2042	1.18%	1.23%
11	HA8	3.75% Note Due 2042	1.40%	1.23%
12	HB6	2.45% Note Due 2022	0.82%	0.82%
13	HC4	3.25% Note Due 2023	0.96%	0.94%
14	HD2	4.6% Note Due 2043	1.27%	1.28%
15	HE0	3.85% Note Due 2023	0.95%	0.94%
16	HF7	5.125% Note Due 2043	1.80%	1.75%
17	HG5	3.75% Note Due 2024	0.82%	0.81%
18	HH3	4.75% Note Due 2044	1.01%	1.07%
19	HK6	3.4% Note Due 2024	0.96%	0.96%
20	HL4	4.3% Note Due 2045	1.16%	1.13%
21	HM2	3.5% Note Due 2025	0.40%	0.38%
22	HN0	4.25% Note Due 2046	0.96%	1.01%
23	HP5	2.95% Note Due 2026	0.38%	0.36%
24	HR1	4.% Note Due 2046	0.74%	0.63%
25	HS9	3.3% Note Due 2027	0.40%	0.36%
26	HW0	3.3% Note Due 2027	0.30%	0.28%
27	HY6	3.95% Note Due 2047	0.71%	0.68%
28	JA6	4.65% Note Due 2028	0.46%	0.39%
29	HZ3	4.25% Note Due 2023	N/A	N/A

Sources: LSEG Workspace (formerly Eikon) and Bloomberg.

Note:

(1) For description of this analysis, see Section VIII.I in my report. Bid-ask spread calculations begin 4/29/2015 and go through the Class Period. The spread analyses begin on the first date for which Bloomberg had data.

(2) Bloomberg did not have data for the note "HZ3".

Exhibit 25
PG&E Notes Outstanding and Institutional Holdings for the Quarter Ending 9/30/2018

#	PG&E Notes	Description	Number of Notes Held by Institutions [1]	Notes Outstanding [2]	Percentage of Notes Held by Institutions [3] = [1]/[2]
1	GE1	6.05% Note Due 2034	1,760,700	3,000,000	58.7%
2	GJ0	5.8% Note Due 2037	23,311	950,000	2.5%
3	GM3	6.35% Note Due 2038	181,494	400,000	45.4%
4	GQ4	6.25% Note Due 2039	330,526	550,000	60.1%
5	GS0	5.4% Note Due 2040	562,390	800,000	70.3%
6	GT8	3.5% Note Due 2020	423,644	800,000	53.0%
7	GV3	4.25% Note Due 2021	209,368	300,000	69.8%
8	GW1	3.25% Note Due 2021	152,467	250,000	61.0%
9	GY7	4.5% Note Due 2041	114,636	250,000	45.9%
10	GZ4	4.45% Note Due 2042	129,782	400,000	32.4%
11	HA8	3.75% Note Due 2042	147,306	350,000	42.1%
12	HB6	2.45% Note Due 2022	179,708	400,000	44.9%
13	HC4	3.25% Note Due 2023	226,220	375,000	60.3%
14	HD2	4.6% Note Due 2043	154,838	375,000	41.3%
15	HE0	3.85% Note Due 2023	207,427	300,000	69.1%
16	HF7	5.125% Note Due 2043	195,777	500,000	39.2%
17	HG5	3.75% Note Due 2024	269,906	450,000	60.0%
18	HH3	4.75% Note Due 2044	262,072	675,000	38.8%
19	HK6	3.4% Note Due 2024	235,489	350,000	67.3%
20	HL4	4.3% Note Due 2045	168,471	600,000	28.1%
21	HM2	3.5% Note Due 2025	322,878	600,000	53.8%
22	HN0	4.25% Note Due 2046	186,741	450,000	41.5%
23	HP5	2.95% Note Due 2026	287,236	600,000	47.9%
24	HR1	4.% Note Due 2046	233,978	600,000	39.0%
25	HS9	3.3% Note Due 2027	235,513	400,000	58.9%
26	HW0	3.3% Note Due 2027	544,276	1,129,736	48.2%
27	HY6	3.95% Note Due 2047	265,636	849,800	31.3%
28	JA6	4.65% Note Due 2028	129,034	300,000	43.0%
29	HZ3	4.25% Note Due 2023	222,859	500,000	44.6%
Average:					**48.2%**

Sources: Institutional Holdings from Bloomberg, Notes Outstanding from LSEG Workspace (previously Eikon).

Note: The percentage of shares held by institutions is a lower bound estimate because the reported number of notes held by institutions only reflects public information available to Bloomberg.

Exhibit 26
PG&E Notes
Tests for Autocorrelation During the Class Period

			Bid Prices			Ask Prices		
#	PG&E Notes	Description	Coefficient on Previous Day's Return [2]	t-Statistic	Sig Level [4]	Coefficient on Previous Day's Return [3]	t-Statistic	Sig Level [4]
1	GE1	6.05% Note Due 2034	0.21	6.07	***	0.17	4.85	***
2	GJ0	5.8% Note Due 2037	0.19	5.42	***	0.07	1.98	**
3	GM3	6.35% Note Due 2038	0.05	0.86		-0.14	-2.65	***
4	GQ4	6.25% Note Due 2039	0.10	1.93	*	-0.04	-0.78	
5	GS0	5.4% Note Due 2040	-0.02	-0.49		-0.04	-1.03	
6	GT8	3.5% Note Due 2020	-0.13	-3.26	***	-0.07	-1.77	*
7	GV3	4.25% Note Due 2021	-0.33	-4.09	***	-0.19	-2.24	**
8	GW1	3.25% Note Due 2021	-0.25	-5.26	***	-0.16	-3.36	***
9	GY7	4.5% Note Due 2041	0.11	3.30	***	0.09	2.69	***
10	GZ4	4.45% Note Due 2042	0.03	1.02		0.02	0.51	
11	HA8	3.75% Note Due 2042	-0.08	-2.38	**	-0.10	-2.84	***
12	HB6	2.45% Note Due 2022	-0.07	-2.01	**	-0.12	-3.28	***
13	HC4	3.25% Note Due 2023	-0.09	-2.18	**	-0.08	-1.93	*
14	HD2	4.6% Note Due 2043	0.04	1.07		0.02	0.55	
15	HE0	3.85% Note Due 2023	-0.07	-1.89	*	-0.07	-2.12	**
16	HF7	5.125% Note Due 2043	-0.05	-1.44		-0.06	-1.55	
17	HG5	3.75% Note Due 2024	-0.07	-2.15	**	-0.07	-1.95	*
18	HH3	4.75% Note Due 2044	0.02	0.57		0.01	0.16	
19	HK6	3.4% Note Due 2024	-0.07	-1.92	*	-0.11	-3.08	***
20	HL4	4.3% Note Due 2045	0.03	0.80		0.02	0.55	
21	HM2	3.5% Note Due 2025	0.27	7.19	***	0.24	6.58	***
22	HN0	4.25% Note Due 2046	0.02	0.67		0.00	0.03	
23	HP5	2.95% Note Due 2026	0.21	4.33	***	0.19	4.03	***
24	HR1	4.% Note Due 2046	-0.13	-2.77	***	-0.16	-3.40	***
25	HS9	3.3% Note Due 2027	0.23	4.55	***	0.18	3.59	***
26	HW0	3.3% Note Due 2027	0.15	1.62		0.11	1.16	
27	HY6	3.95% Note Due 2047	-0.19	-2.02	**	-0.24	-2.57	**
28	JA6	4.65% Note Due 2028	0.74	5.63	***	0.68	5.25	***
29	HZ3	4.25% Note Due 2023	N/A	N/A		N/A	N/A	

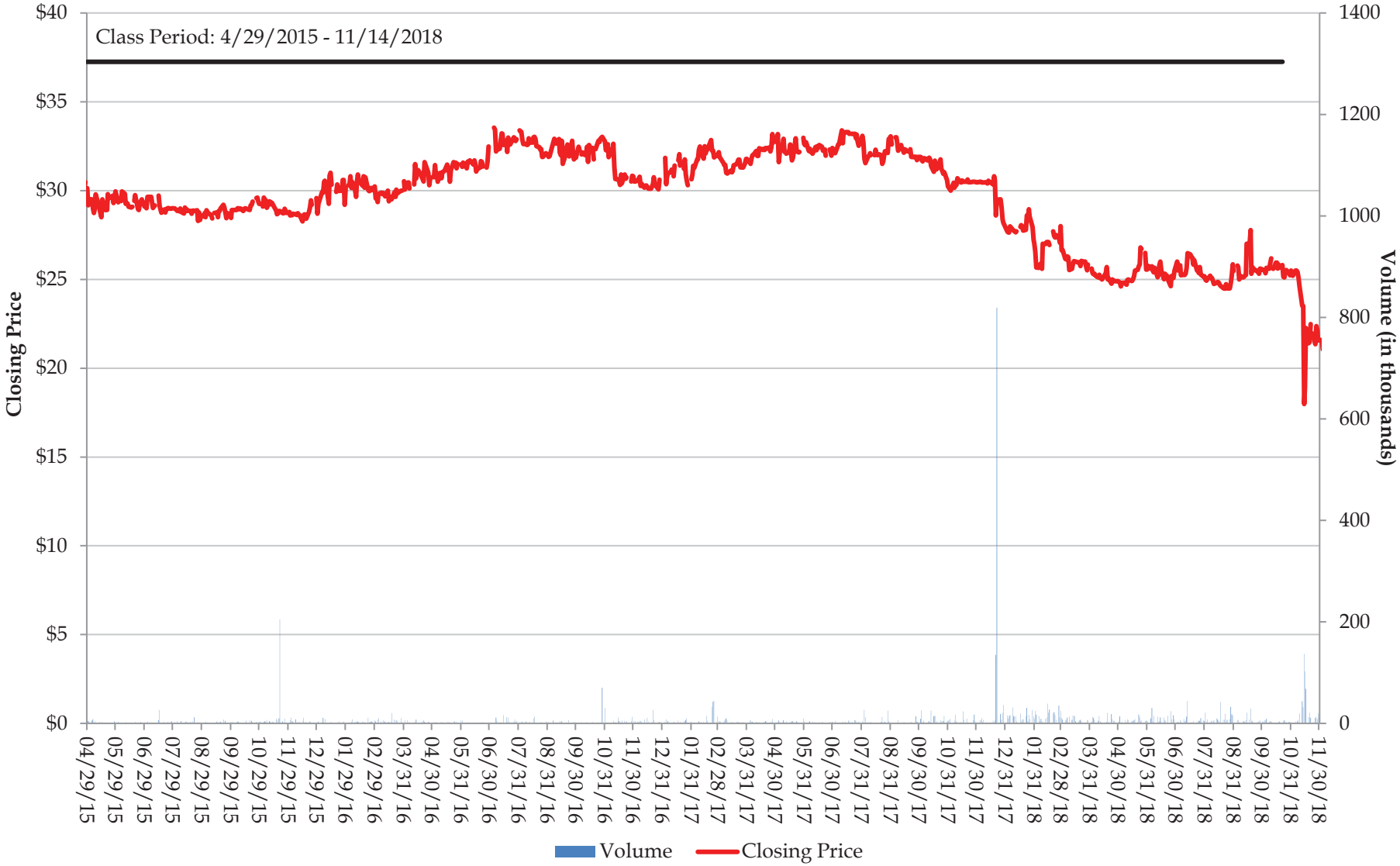
Sources: LSEG Workspace (formerly Eikon) and Bloomberg.
Notes:
(1) The autocorrelation analysis begins on the second day of note data, rather than the first date of note data, because the return data is not available until the second day.
(2) Over the Class Period, the dependent variable is the return from the end of day bid price and the previous day's end of day bid price return as the independent variable.
(3) Over the Class Period, the dependent variable is the return from the end of day ask price and the previous day's end of day ask price return as the independent variable.
(4) "***" Denotes statistical significance at the 99% confidence level or greater, "**" denotes statistical significance at the 95% confidence level or greater, and "*" denotes statistical significance at the 90% confidence level or greater.
(5) Bloomberg did not have end of day bid or ask prices for the note ending in "HZ3".

Exhibit 27
PG&E Notes
Arbitrage Analysis During the Class Period

			Bid Prices					Ask Prices				
#	PG&E Notes	Description	Absolute Value (Magnitude) of Autocorrelation Coefficient [A]	Average Magnitude of Price Movement [B]	Benefit of Arbitrage [C] = [A] * [B]	Bid-Ask Spread [D]	Is the benefit of arbitrage higher than the bid-ask spread? [E]	Absolute Value (Magnitude) of Autocorrelation Coefficient [F]	Average Magnitude of Price Movement [G]	Benefit of Arbitrage [H] = [F] * [G]	Bid-Ask Spread [I]	Is the benefit of arbitrage higher than the bid-ask spread? [J]
1	GE1	6.05% Note Due 2034	0.21	0.39%	0.08%	1.11%	NO	0.17	0.40%	0.07%	1.11%	NO
2	GJ0	5.8% Note Due 2037	0.19	0.45%	0.09%	1.55%	NO	0.07	0.45%	0.03%	1.55%	NO
3	GM3	6.35% Note Due 2038	0.05	0.44%	0.02%	2.05%	NO	0.14	0.48%	0.07%	2.05%	NO
4	GQ4	6.25% Note Due 2039	0.10	0.40%	0.04%	1.91%	NO	0.04	0.43%	0.02%	1.91%	NO
5	GS0	5.4% Note Due 2040	0.02	0.49%	0.01%	1.88%	NO	0.04	0.50%	0.02%	1.88%	NO
6	GT8	3.5% Note Due 2020	0.13	0.12%	0.02%	0.53%	NO	0.07	0.12%	0.01%	0.53%	NO
7	GV3	4.25% Note Due 2021	0.33	0.11%	0.04%	0.68%	NO	0.19	0.10%	0.02%	0.68%	NO
8	GW1	3.25% Note Due 2021	0.25	0.17%	0.04%	0.78%	NO	0.16	0.16%	0.03%	0.78%	NO
9	GY7	4.5% Note Due 2041	0.11	0.55%	0.06%	1.23%	NO	0.09	0.55%	0.05%	1.23%	NO
10	GZ4	4.45% Note Due 2042	0.03	0.53%	0.02%	1.18%	NO	0.02	0.53%	0.01%	1.18%	NO
11	HA8	3.75% Note Due 2042	0.08	0.57%	0.05%	1.40%	NO	0.10	0.57%	0.05%	1.40%	NO
12	HB6	2.45% Note Due 2022	0.07	0.19%	0.01%	0.82%	NO	0.12	0.19%	0.02%	0.82%	NO
13	HC4	3.25% Note Due 2023	0.09	0.22%	0.02%	0.96%	NO	0.08	0.21%	0.02%	0.96%	NO
14	HD2	4.6% Note Due 2043	0.04	0.55%	0.02%	1.27%	NO	0.02	0.55%	0.01%	1.27%	NO
15	HE0	3.85% Note Due 2023	0.07	0.21%	0.01%	0.95%	NO	0.07	0.21%	0.02%	0.95%	NO
16	HF7	5.125% Note Due 2043	0.05	0.51%	0.03%	1.80%	NO	0.06	0.52%	0.03%	1.80%	NO
17	HG5	3.75% Note Due 2024	0.07	0.21%	0.02%	0.82%	NO	0.07	0.21%	0.01%	0.82%	NO
18	HH3	4.75% Note Due 2044	0.02	0.55%	0.01%	1.01%	NO	0.01	0.55%	0.00%	1.01%	NO
19	HK6	3.4% Note Due 2024	0.07	0.22%	0.01%	0.96%	NO	0.11	0.23%	0.02%	0.96%	NO
20	HL4	4.3% Note Due 2045	0.03	0.57%	0.02%	1.16%	NO	0.02	0.58%	0.01%	1.16%	NO
21	HM2	3.5% Note Due 2025	0.27	0.26%	0.07%	0.40%	NO	0.24	0.26%	0.06%	0.40%	NO
22	HN0	4.25% Note Due 2046	0.02	0.57%	0.01%	0.96%	NO	0.00	0.57%	0.00%	0.96%	NO
23	HP5	2.95% Note Due 2026	0.21	0.26%	0.06%	0.38%	NO	0.19	0.26%	0.05%	0.38%	NO
24	HR1	4.% Note Due 2046	0.13	0.57%	0.07%	0.74%	NO	0.16	0.58%	0.09%	0.74%	NO
25	HS9	3.3% Note Due 2027	0.23	0.27%	0.06%	0.40%	NO	0.18	0.27%	0.05%	0.40%	NO
26	HW0	3.3% Note Due 2027	0.15	0.36%	0.05%	0.30%	NO	0.11	0.36%	0.04%	0.30%	NO
27	HY6	3.95% Note Due 2047	0.19	0.64%	0.12%	0.71%	NO	0.24	0.66%	0.16%	0.71%	NO
28	JA6	4.65% Note Due 2028	0.74	0.46%	0.34%	0.46%	NO	0.68	0.46%	0.31%	0.46%	NO
29	HZ3	4.25% Note Due 2023	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sources: LSEG Workspace (formerly Eikon) and Bloomberg.
Note:
(1) Bloomberg did not have end of day bid or ask prices for the note ending in "HZ3".

Exhibit 28-1
PG&E 6.00% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pa (CUSIP: 694308206)



Sources: Complaint and LSEG Workspace (formerly Eikon).

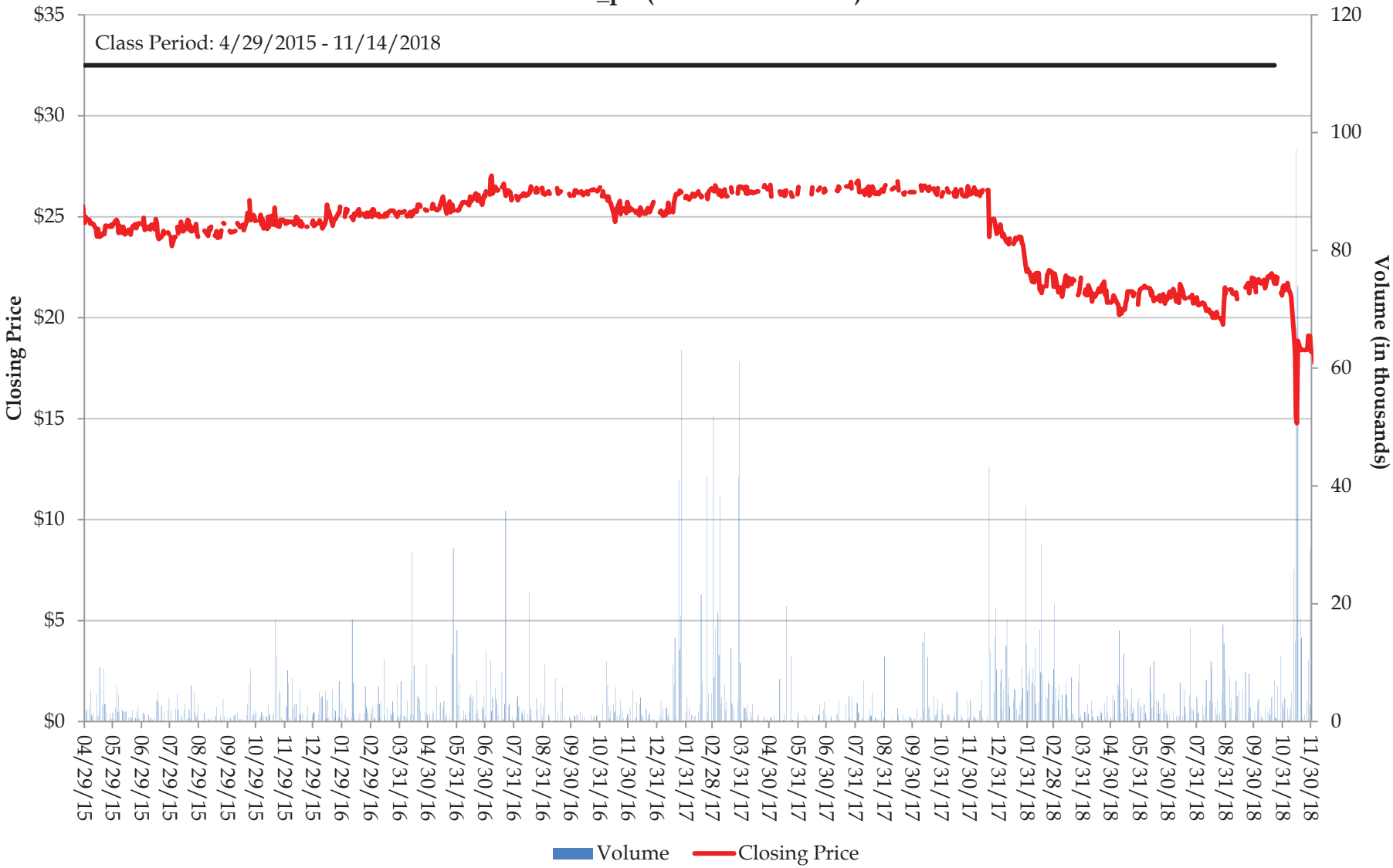
Exhibit 28-2
PG&E 5.50% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pb (CUSIP: 694308305)

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 28-3
PG&E 5.00% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pc (CUSIP: 694308404)

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 28-4
PG&E 5.00% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pd (CUSIP: 694308503)



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 28-5
PG&E 5.00% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pe (CUSIP: 694308602)

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 28-6
PG&E 4.80% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pg (CUSIP: 694308701)

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 28-7
PG&E 4.50% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_ph (CUSIP: 694308800)

Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 28-8
PG&E 4.36% Preferred Stock Price & Volume
4/29/2015 - 11/30/2018
PCG_pi (CUSIP: 694308883)

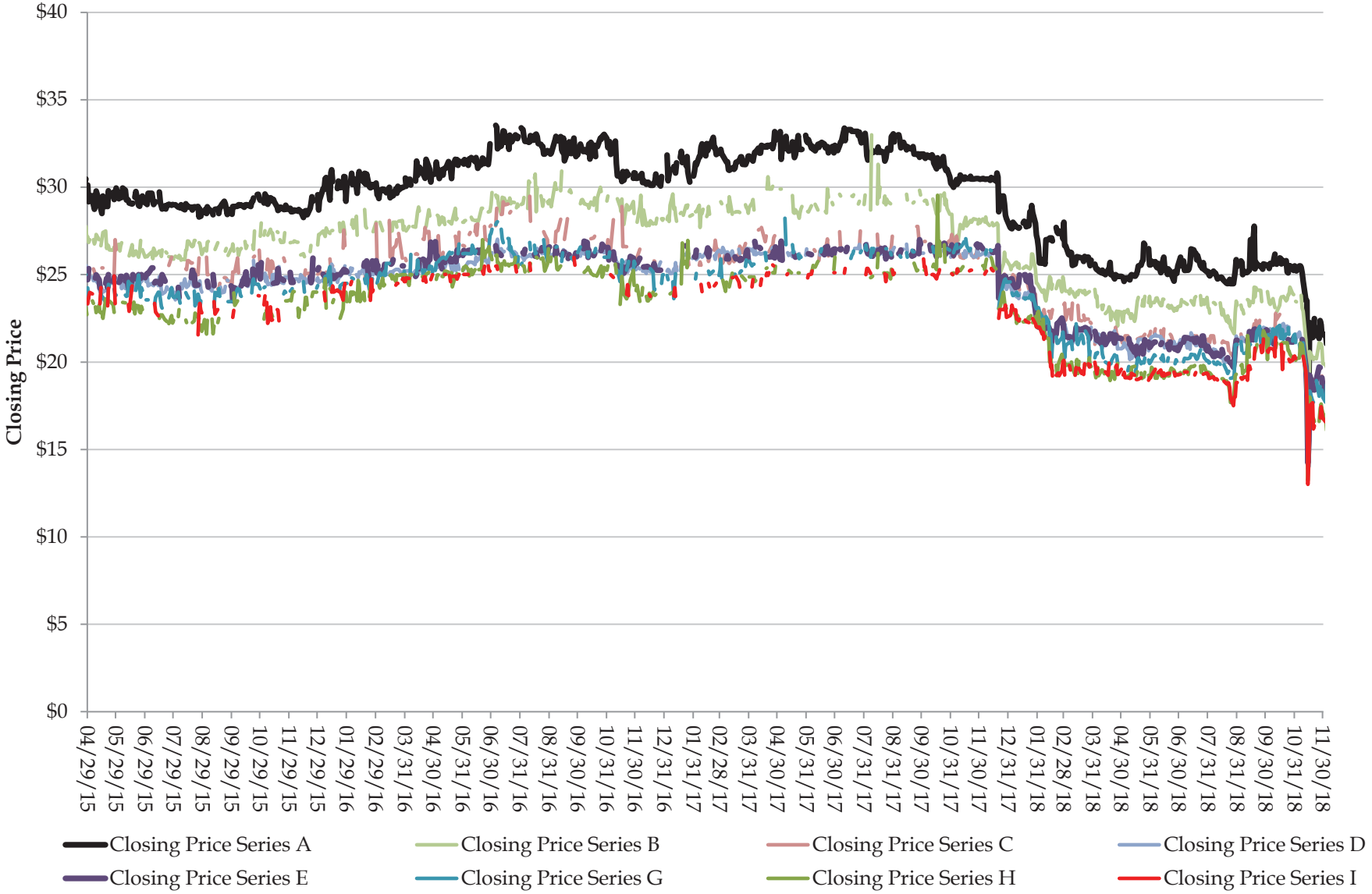
Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 29
PG&E Preferred Stock Average Weekly Trading Volume During the Class Period

#	PG&E Preferred Stock	Dividend	Average Weekly Trading Volume
1	PCG_pa 694308206	6.00%	0.76%
2	PCG_pb 694308305	5.50%	1.05%
3	PCG_pc 694308404	5.00%	1.85%
4	PCG_pd 694308503	5.00%	1.05%
5	PCG_pe 694308602	5.00%	0.10%
6	PCG_pg 694308701	4.80%	1.52%
7	PCG_ph 694308800	4.50%	1.66%
8	PCG_pi 694308883	4.36%	1.76%

Sources: Bloomberg, and LSEG Workspace (formerly Eikon).

Exhibit 30
PG&E Preferred Stock Price
4/29/2015 - 11/30/2018



Sources: Complaint and LSEG Workspace (formerly Eikon).

Exhibit 31

Comparison of Statistical Significance, Abnormal Returns, and Volume for PG&E Preferred Securities on the Top Ten Days vs. Days with Least Amount of News during the Class Period

Statistic	Top Ten Days	Days with the Least Amount of News
N [(1)]	76	357
Significant Days at 95% Confidence Level	26	17
% Significant Days at 95% Confidence Level [(2)]	34.21%	4.76%
Average Absolute Abnormal Return [(3)]	5.02%	1.05%
Average Volume [(4)]	15,413	2,145

Notes:
(1) Results are based on the first date for which I have abnormal return data for each respective preferred stock, through the end of the Class Period. For the purposes of this analysis, I selected the days with least news. Days with least news were days that had 5 or fewer news articles via the Factiva database (and not otherwise identified to be material news, as identified in Exhibit 9), and no analyst reports or SEC filings were issued.
(2) 34.21% rate of statistical significance is statistically significantly different than 4.76% at the 99% confidence level using both a Chi-Square test and Fisher's Exact test.
(3) 5.02% absolute return is statistically significantly different than 1.05% based on a t-test for difference of means at the 99% confidence level.
(4) The difference between 15,413 and 2,145 is statistically significant at the 99% confidence level.

Exhibit 32
PG&E Preferred Stock
Market Capitalization Rankings

	PCG_pa CUSIP: 694308206		PCG_pb CUSIP: 694308305		PCG_pc CUSIP: 694308404		PCG_pd CUSIP: 694308503		PCG_pe CUSIP: 694308602		PCG_pg CUSIP: 694308701		PCG_ph CUSIP: 694308800		PCG_pi CUSIP: 694308883	
Last trading day of:	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]	Market Capitalization[1]	Rank[2]
Q2 2015	$122.77	20%	$30.56	6%	$10.40	2%	$43.74	8%	$257.99	30%	$18.68	3%	$14.06	2%	$9.90	2%
Q3 2015	$121.72	22%	$31.38	7%	$10.06	2%	$43.39	10%	$242.51	33%	$18.60	4%	$13.99	3%	$9.44	2%
Q4 2015	$123.19	22%	$32.03	8%	$10.10	3%	$43.73	10%	$262.12	34%	$19.35	4%	$14.67	3%	$9.73	2%
Q1 2016	$128.55	24%	$32.56	8%	$10.37	3%	$44.81	11%	$262.84	35%	$19.98	5%	$15.28	4%	$10.29	3%
Q2 2016	$136.79	24%	$34.00	8%	$11.13	3%	$46.25	11%	$271.82	35%	$21.69	5%	$15.95	4%	$10.54	3%
Q3 2016	$134.14	23%	$34.08	8%	$11.20	3%	$46.29	10%	$268.55	33%	$20.82	5%	$15.78	3%	$10.68	3%
Q4 2016	$129.05	22%	$33.08	8%	$9.99	3%	$45.75	10%	$264.19	31%	$19.83	5%	$14.19	3%	$9.93	3%
Q1 2017	$133.85	22%	$33.85	8%	$10.73	2%	$47.10	10%	$266.35	31%	$20.44	5%	$15.20	3%	$10.21	2%
Q2 2017	$136.46	22%	$34.78	8%	$10.68	3%	$46.68	10%	$273.18	31%	$21.42	5%	$15.89	4%	$10.50	2%
Q3 2017	$134.35	21%	$34.67	8%	$10.84	3%	$46.62	10%	$275.95	31%	$20.82	5%	$15.39	4%	$10.69	2%
Q4 2017	$118.77	19%	$30.31	7%	$9.83	2%	$42.94	9%	$254.38	29%	$19.48	4%	$14.10	3%	$9.43	2%
Q1 2018	$108.79	18%	$28.51	6%	$8.88	2%	$39.10	9%	$221.88	27%	$16.35	4%	$12.07	3%	$8.30	2%
Q2 2018	$107.36	20%	$27.16	7%	$8.34	2%	$37.13	9%	$213.22	28%	$15.90	4%	$11.79	3%	$8.06	1%
Q3 2018	$107.86	19%	$28.57	8%	$8.68	2%	$39.08	10%	$222.78	28%	$16.89	4%	$13.32	3%	$8.92	2%
Q4 2018	$80.80	20%	$20.12	8%	$6.30	2%	$28.01	10%	$162.54	28%	$11.85	5%	$8.54	3%	$5.75	2%
Average:	**$121.63**		**$31.04**		**$9.84**		**$42.71**		**$248.02**		**$18.81**		**$14.01**		**$9.49**	

Sources: Bloomberg and S&P Capital IQ.
1) Market Capitalization in millions.
2) Percentile Rank on the NYSE and NASDAQ.

Exhibit 33
PG&E Preferred Securities Bid-Ask Spread

#	PG&E Preferred Stock	Dividend	Average	Median
1	PCG_pa 694308206	6.00%	1.66%	1.46%
2	PCG_pb 694308305	5.50%	2.63%	2.31%
3	PCG_pc 694308404	5.00%	3.43%	3.06%
4	PCG_pd 694308503	5.00%	1.71%	1.55%
5	PCG_pe 694308602	5.00%	2.59%	2.38%
6	PCG_pg 694308701	4.80%	3.14%	2.95%
7	PCG_ph 694308800	4.50%	3.14%	2.80%
8	PCG_pi 694308883	4.36%	3.38%	3.00%

Sources: LSEG Workspace (formerly Eikon), Bloomberg, TICK Data

Note:

(1) For a description of this analysis, see Section IX.H in my report. Bid-ask spread calculations begin on the first date during the Class Period on which the Preferred Securities traded.

Exhibit 34
PG&E Preferred Stock Shares Outstanding and Institutional Holdings for the Quarter Ending 9/30/2018

PG&E Preferred Stock	Dividend	Number of Shares Held by Institutions [1]	Shares Outstanding [2]	Percentage of Shares Held by Institutions [3] = [1] / [2]
PCG_pa 694308206	6.00%	464,984	4,211,661	11.0%
PCG_pb 694308305	5.50%	82,076	1,173,163	7.0%
PCG_pc 694308404	5.00%	53,698	400,000	13.4%
PCG_pd 694308503	5.00%	8,200	1,778,172	0.5%
PCG_pe 694308602	5.00%	152,560	10,319,782	1.5%
PCG_pg 694308701	4.80%	2,000	793,031	0.3%
PCG_ph 694308800	4.50%	23,994	611,142	3.9%
PCG_pi 694308883	4.36%	46,619	418,291	11.1%
Average:				**6.1%**

Sources: Bloomberg, and LSEG Workspace (formerly Eikon).
Note: The percentage of shares held by institutions is a lower bound estimate because the reported number of Preferred Securities held by institutions only reflects public information available to Bloomberg.

Exhibit 35
PG&E Preferred Securities
Tests for Autocorrelation During the Class Period

#	PG&E Preferred Stock	Dividend	Coefficient on Previous Day's Return [1]	t-Statistic	Sig Level [2]
1	PCG_pa 694308206	6.00%	-0.25	-6.41	***
2	PCG_pb 694308305	5.50%	-0.36	-9.49	***
3	PCG_pc 694308404	5.00%	-0.29	-6.48	***
4	PCG_pd 694308503	5.00%	-0.19	-4.80	***
5	PCG_pe 694308602	5.00%	-0.20	-4.21	***
6	PCG_pg 694308701	4.80%	-0.12	-2.47	**
7	PCG_ph 694308800	4.50%	-0.24	-5.30	***
8	PCG_pi 694308883	4.36%	-0.17	-2.89	***

Sources: Bloomberg and LSEG Workspace (formerly Eikon).

Notes:

(1) For each security, I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable. Earnings announcements and the alleged corrective disclosure dates have been removed from estimation.

(2) "***" Denotes statistical significance at the 99% confidence level or greater, "**" denotes statistical significance at the 95% confidence level or greater, and "*" denotes statistical significance at the 90% confidence level or greater.

Exhibit 36
PG&E Preferred Securities
Arbitrage Analysis During the Class Period

#	PG&E Preferred Stock	Dividend	Absolute Value (Magnitude) of Autocorrelation Coefficient [A]	Average Magnitude of Price Movement [B]	Benefit of Arbitrage [C] = [A] * [B]	Bid-Ask Spread [D]	Potential Benefit of Arbitrage [E]
1	PCG_pa 694308206	6.00%	0.25	0.90%	0.22%	1.66%	NO
2	PCG_pb 694308305	5.50%	0.36	1.23%	0.44%	2.63%	NO
3	PCG_pc 694308404	5.00%	0.29	1.58%	0.46%	3.43%	NO
4	PCG_pd 694308503	5.00%	0.19	0.87%	0.16%	1.71%	NO
5	PCG_pe 694308602	5.00%	0.20	1.12%	0.22%	2.59%	NO
6	PCG_pg 694308701	4.80%	0.12	1.33%	0.16%	3.14%	NO
7	PCG_ph 694308800	4.50%	0.24	1.43%	0.34%	3.14%	NO
8	PCG_pi 694308883	4.36%	0.17	1.29%	0.21%	3.38%	NO

Sources: Bloomberg and LSEG Workspace (formerly Eikon).

Notes:

(1) For each security, I perform a regression with the abnormal return from the event study as the dependent variable and the previous day's abnormal return as the independent variable. Earnings announcements and the alleged corrective disclosure dates have been removed from estimation.

Appendix A
Documents Considered

Court Documents

- Third Amended Consolidated Class Action Complaint for Violation of the Federal Securities Laws filed May 28, 2019, *In Re PG&E Corporation Securities Litigation*, Civil Action No. 3-18-cv-03509-EJD.

Court Decisions and Securities Law

- *Basic, Inc. v. Levinson*, 485 U.S. 224 (1988).
- Bromberg & Lowenfels, 4 *Securities Fraud and Commodities Fraud*, § 8.6. (Aug. 1988).
- *Cammer, et al., v. Bruce M. Bloom, et al.*, 711 F. Supp. 1264 (D.N.J. 1989).
- *Halliburton Co., et al., v. Erica P. John Fund, Inc*., 134 S. Ct. 2398 (2014).
- *Krogman v. Sterritt*, 202 F.R.D. 467 (N.D. Tex. 2001).
- Private Securities Litigation Reform Act of 1995, dated December 22, 1995.
- 15 U.S.C. § 77k(e).

SEC Filings

- PG&E SEC Form Prospectus filings submitted during the Class Period. Including but not limited to:
    - PG&E SEC Form Prospectus filed on February 24, 2016.
    - PG&E SEC Form Prospectus filed on November 29, 2016.
    - PG&E SEC Form Prospectus filed on March 8, 2017.
    - PG&E SEC Form Prospectus filed on April 13, 2018.
- PG&E SEC Form 10-K filings submitted throughout the Class Period. Including but not limited to:
    - PG&E SEC Form 10-K for the fiscal year ended December 31, 2017.
- PG&E SEC Form 10-Q filings submitted throughout the Class Period.
- PG&E SEC Form 8-K filings submitted during the Class Period. Including but not limited to:
    - PG&E SEC Form 8-K filed on November 13, 2018, 5:05 PM.
- PG&E SEC Form S-3 filed on January 4, 2017.
- PG&E SEC Form S-3/A filed on January 19, 2017.
- PG&E SEC Form S-3ASR filed on February 18, 2016.

Security Data

- Historical data for PG&E Common Stock, companies comprising the Peer Index, and the S&P 500 Total Return Index were obtained from S&P Capital IQ.

- Trade and quote data for PG&E Common Stock during the Class Period and one hundred randomly selected companies trading on the New York Stock Exchange and NASDAQ for December 2015 were obtained from Tick Data, *see* https://tickapi.tickdata.com/. Companies trading on the New York Stock Exchange and NASDAQ for December 2015 were identified using LSEG Workspace.
- Institutional and insider holdings data was obtained from S&P Capital IQ and Bloomberg.
- PG&E Common Stock options data was obtained from Bloomberg.
- PG&E Common Stock market capitalization percentiles were obtained from Bloomberg.
- PG&E Notes data was obtained from LSEG Workspace and Bloomberg.
- PG&E Preferred Securities data was obtained from LSEG Workspace.
- Turnover velocity data for NYSE and NASDAQ were obtained from the World Federation of Exchanges, *see* https://www.world-exchanges.org/home/index.php/statistics/monthly-reports.
- US Bond Market Statistics were obtained from SIFMA (*See* http://www.sifma.org/research/statistics.aspx)

PG&E News

- PG&E news headlines and select articles downloaded from Factiva for the Class Period. The Factiva search for news over the Class Period resulted in 13,469 unique articles as a result of two searches: (1) one search for "All Sources" with the company field "PG&E Corp" and (2) a separate search for "Major News and Business Sources" with keyword field "PG&E" or "Pacific Gas and Electric Company" but excluding news with the company field "PG&E Corp." Both searches were conducted for the period April 29, 2015 – November 14, 2018. Duplicate articles have been removed by a proprietary function accessible in Factiva's search builder. I acknowledge that this may not reflect all news as the Factiva database is limited to certain sources and content type.
- "PG&E power lines may have provided key spark to North Bay inferno" *San Francisco Business Times Online*, October 12, 2017.
- "California regulators tell PG&E to preserve fire evidence," *The San Francisco Chronicle*, October 12, 2017, 10:34 PM.
- "PG&E is having worst week in nine years as wildfires rage," *St. Albens Messenger*, October 14, 2017.
- "PG&E Cut to Buy From Conviction Buy by Goldman Sachs," *Dow Jones Institutional News*, October 16, 2017, 9:41 AM.
- "PG&E DECLINE CONTINUES OVER FEAR OF ROLE IN FIRES; INVESTORS DUMP THE UTILITY'S STOCK AMID STATE REGULATORS' MOVES TOWARD A POSSIBLE INVESTIGATION," *San Jose Mercury News*, October 17, 2017.
- "PG&E Announces Suspension of Dividend, Citing Uncertainty Related to Causes and Potential Liabilities Associated with Northern California Wildfires," *Business Wire*, December 20, 2017, 5:15 PM.

- "PG&E, Edison surge after California to work toward updating liability rules," *Seeking Alpha*, March 13, 2018, 3:42 PM.
- "PG&E lines faulted in some wildfires," *The San Francisco Chronicle*, May 26, 2018.
- "PG&E Determines to Not Proceed With Public Safety Power Shutoff Planned for Portions of Eight Northern California Counties," *Business Wire*, November 8, 2018, 5:34 PM.
- "PG&E reports power line problem in Butte County near time and place where wildfire sparked," *The Sacramento Bee*, November 9, 2018.
- "California wildfires: 150,000 evacuated as death toll climbs," *U-Wire*, November 10, 2018.
- "10:31 EDT California utility stocks collapse as California wildfire ragesShares...," *Theflyonthewall.com*, November 12, 2018
- "15:09 EDT Regulators investigating PG&E, Edison over California fires, Mercury...," *Theflyonthewall.com*, November 12, 2018.
- "PG&E plunges 21% amid disclosure of an 'electric incident' just before wildfire," *CNBC*, November 14, 2018, 9:26 AM.
- PG&E earnings conference call and investor call transcripts during the Class Period, including but not limited to:
    - "FQ1 2016 Earnings Call Transcripts," *S&P Capital IQ*, May 4, 2016.
- PG&E earnings and guidance update press releases during the Class Period, including but not limited to:
    - "PG&E Corporation Releases Full-Year and Fourth-Quarter 2016 Financial Results," *Business Wire*, February 16, 2017.

PG&E Analyst Reports

- PG&E analyst reports supplied by Investext and Counsel for the period of April 29, 2015 – November 14, 2018, including but not limited to:
    - "PCG – 2017 Outlook Reaffirmed; LT CapEx and Ratebase Intact," *Guggenheim*, February 16, 2017.
    - "PG&E's Growth Outlook Still Bright but Already Priced Into Premium Valuation," *Morningstar*, February 16, 2017.

Academic Articles

- Aharony, Joseph and Swary, Itzhak, "Quarterly Dividend and Earnings Announcements and Stockholders' Returns: An Empirical Analysis," *The Journal of Finance* 35, no. 1, (1980).
- Amihud, Yakov, et al. "Liquidity and Asset Prices," *Foundations and Trends in Finance* 1, no. 4 (2005).
- Avramov, Doron, et al. "Liquidity and Autocorrelations in Individual Stock Returns," *The Journal of Finance* 61, no. 5 (2006).

- Barber, Brad, et al. "The Fraud-on-the-Market Theory and the Indicators of Common Stocks' Efficiency," *The Journal of Corporation Law* 19, (1994).
- Beaver, William H. "The Information Content of Annual Earnings Announcements: New Insights from Intertemporal and Cross-Sectional Behavior," *Empirical Research in Accounting: Selected Studies, 1968,* supplement to the *Journal of Accounting Research* 6, (1968).
- Binder, John J. "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting* 11, (1998).
- Braun, Phillip A. "Good News, Bad News Volatility, and Betas," *The Journal of Finance* 50, no. 5 (1995).
- Brealey, Richard A. and Myers, Stewart C., *Principles of Corporate Finance*, (3rd ed.) McGraw-Hill, (1988).
- Brealey, Richard A., et al. *Principles of Corporate Finance*, (10th ed.) McGraw Hill (2011).
- DeAngelo, Harry and Masulis, Ronald W., "Leverage and Dividend Irrelevancy under Corporate and Personal Taxation," *The Journal of Finance* 35, No. 2, (1980).
- Elton, Edwin J., et al. "Factors Affecting the Valuation of Corporate Bonds," *Journal of Banking and Finance* 28, (2004).
- Fabozzi, Frank J., et al. *Foundations of Financial Markets and Institutions*, (4th ed.) Prentice Hall, (2010).
- Fama, Eugene F. "Efficient Capital Markets: A Review of Theory and Empirical Work," *The Journal of Finance* 25, no. 2 (1970).
- Goldstein, Michael A. et al. "Transparency and Liquidity: A Controlled Experiment on Corporate Bonds," *The Review of Financial Studies* 20, no. 2, 2007.
- Greene, William H. *Econometric Analysis*, (6th ed.) Prentice Hall (2008).
- Gujarati, Damodar N. *Basic Econometrics*, (3rd ed.) McGraw Hill (1995).
- Hotchkiss, Edith S. and Ronen, Tavy, "The Informational Efficiency of the Corporate Bond Market: An Intraday Analysis," *The Review of Financial Studies* 15, no. 5, (2002).
- Huang, Roger D. & Stoll, Hans R. "Dealer versus auction markets: A paired comparison of execution costs on NASDAQ and the NYSE," *Journal of Financial Economics* 41, no. 3 (1996).
- Hull, John, *Options, Futures and Other Derivatives*, (7th ed.) Prentice Hall, (2009).
- Jensen, Michael C. "Some Anomalous Evidence Regarding Market Efficiency," *Journal of Financial Economics* 6, nos. 2/3 (1978).
- Kumar, Raman, et al. "The Impact of Options Trading on the Market Quality of the Underlying Security: An Empirical Analysis," *The Journal of Finance* 53, no. 2 (1998).
- MacKinlay, A. Craig. "Event Studies in Economics and Finance," *Journal of Economic Literature* 35, no. 1 (1997).

- Mahanti, Sriketan et al., "Latent Liquidity: A New Measure of Liquidity, with Application to Corporate Bonds," *Journal of Financial Economics* 88, no. 2 (2008).
- May, Robert G. "The Influence of Quarterly Earnings Announcements on Investor Decisions as Reflected in Common Stock Price Changes," *Empirical Research in Accounting: Selected Studies, 1971,* supplement to the *Journal of Accounting Research* 9, (1971).
- Merton, Robert C. "On the Pricing of Corporate Debt: The Risk Structure of Interest Rates," *The Journal of Finance* 29, (1974).
- Miller, Merton H. "Debt and Taxes," *The Journal of Finance*, 32, (1977).
- Miller, Merton H. and Scholes, Myron S. "Dividends and Taxes," *Journal of Financial Economics*, (1978).
- Reilly, Frank, and Brown, Keith, *Investment Analysis and Portfolio Management*, (6th ed.) The Dryden Press, (2000).
- Ross, Stephen A. "Options and Efficiency," *Quarterly Journal of Economics* 90, no. 1 (1976).
- Schultz, Paul "Corporate Bond Trading Costs: A Peek Behind the Curtain," *The Journal of Finance* 56, (2001).
- Sharpe, William, et al. *Investments*, (5th ed.) Prentice Hall (1995).
- Tabak, David I. & Dunbar, Frederick C. "Materiality and Magnitude: Event Studies in the Courtroom," *Litigation Services Handbook, The Role of the Financial Expert*, (3rd ed.) (2001).
- Teets, Walter, "The Association between Stock Market Responses to Earnings Announcements and Regulation of Electric Utilities," *Journal of Accounting Research*, 30, (1992).
- The National Academies Press, *Reference Manual on Scientific Evidence*, (3rd ed.) (2011).
- Thomas, Randall S. & Cotter, James F. "Measuring Securities Market Efficiency in the Regulatory Setting," *Law and Contemporary Problems* 63, no. 3, (2000).

Other

- "The NASD – a unique experiment in cooperative regulation," *A.R.W*, December 1960.
- "December Spotlight: Corporate Bond Market Sees Liquidity Improve in Record Year," *Coalition Greenwich*, December 16, 2024.
- https://www.investor.gov/introduction-investing/investing-basics/glossary/market-makers.
- https://www.nyse.com/publicdocs/nyse/NYSE_IPO_Guide_Third_Edition.pdf.
- https://www.nyse.com/market-model.
- https://www.nasdaqtrader.com/Trader.aspx?id=TradingUSEquities.
- http://www.rss-specifications.com/.

- http://www.rss-specifications.com/what-is-rss.htm.
- https://www.sec.gov/about/forms/forms-3.pdf.
- http://www.finra.org/.
- https://www.finra.org/filing-reporting/trace/faq.
- https://www.finra.org/filing-reporting/trace.
- https://investor.pgecorp.com/shareholders/Frequently-Asked-Questions/default.aspx.
- https://www.nyse.com/markets/nyse-american/market-info.
- https://www.nyse.com/markets/nyse-american.

Appendix B

CHAD W. COFFMAN, MPP, CFA

Peregrine Economics
125 South Wacker Drive
Suite 2610
Chicago, Illinois 60606
Mobile: (815) 382-0092
Email: ccoffman@peregrine-econ.com

EMPLOYMENT:

Peregrine Economics
President (2024 - Current)

Peregrine Economics provides independent economic and financial analysis. Peregrine applies big picture thinking and proven economic tools to build a clear narrative around complex problems. Practice areas include: Data Science, General Damages, Labor & Employment, Regulatory Economics, and Securities Valuation.

Global Economics Group, LLC
President (2008 - 2023)

Market Platform Dynamics, LLC
Chief Financial Officer & Chief Operating Officer (2010 – 2023)

Chicago Partners, LLC
Principal (2007 – 2008)
Vice President (2003 – 2007)
Director (2000 – 2003)
Senior Associate (1999 – 2000)
Associate (1997 – 1999)
Research Analyst (1995 – 1997)

EDUCATION:

CFA Chartered Financial Analyst, 2003

M.P.P. University of Chicago, 1997
Masters of Public Policy, with a focus in economics including coursework in Finance, Labor Economics, Econometrics, and Regulation

B.A. Knox College, 1995
Economics, Magna Cum Laude
Graduated with College Honors for Paper entitled "Increasing Efficiency in Water Supply Pricing: Using Galesburg, Illinois as a Case Study"
Dean's List Every Term
Phi Beta Kappa

PROFESSIONAL EXPERIENCE:

Securities, Valuation, and Market Manipulation Cases:

- Testifying Expert in numerous high-profile class action securities matters.

- Expert Consultant for the American Stock Exchange (AMEX) where I evaluated issues related to multiple listing of options. Performed econometric analysis of various measures of option spread using tens of millions of trades.

Testimony in the last four years:

- Testifying Expert in Kevin L. Dougherty, Individually and on Behalf of All Others Similarly Situated, v. Esperion Therapeutics, Inc., et al., Defendants, No. 2:16-cv-10089-AJT-RSW, United States District Court for the Eastern Michigan of Michigan. Filed expert report June 6, 2019. Deposition July 26, 2019. Filed rebuttal reply report October 7, 2019. Filed expert report May 15, 2020. Deposition July 31, 2020.

- Testifying Expert in Eric Weiner, Individually and on Behalf of All Others Similarly Situated, vs. Tivity Health, Inc., Donato Tramuto, Glenn Hargreaves and, Adam Holland, Defendants, Case No.: 3:17-cv-01469 United States District Court for the Middle District of Tennessee. Filed expert report July 1, 2019. Deposition September 4, 2019. Filed rebuttal reply report December 20, 2019. Filed expert report July 30, 2020. Filed rebuttal reply report September 30, 2020. Deposition October 22, 2020.

- Testifying Expert in Peace Officers' Annuity and Benefit Fund of Georgia, Individually and On Behalf of All Others Similarly Situated, and Jacksonville Police and Fire Pension Fund, Individually and On Behalf of All Others Similarly Situated vs. DaVita, Inc. et al., No. 1:17-cv-00304-WJM-NRN, United States District Court for the District of Colorado. Filed expert report January 31, 2020. Deposition May 27, 2020.

- Testifying Expert in In Re Avon Securities Litigation, No. 19 Civ. 01420- CM, United States District Court for the Southern District of New York. Filed expert report February 13, 2020.

- Testifying Expert in In Re Allergan Generic Drug Pricing Securities Litigation, Civil Action No. 2:16-9449 (KSH) (CLW), United States District Court for the District of New Jersey. Filed expert report March 20, 2020. Deposition July 16, 2020. Filed expert reply report November 25, 2020.

- Expert Declaration in Martin Cohen, Individually and On Behalf of All Others Similarly Situated, v. Luckin Coffee Inc., Jenny Zhiya Qian, and Reinout Hendrik Schakel, Case no. 1:20-cv-01293-LJL, United States District Court for the Southern District of New York. Filed declaration May 13, 2020.

- Testifying Expert in In RE Navient Corporation Securities Litigation, No. 1:17-cv-08373-RBK-AMD, United States District Court of New Jersey. Filed expert report May 15, 2020. Deposition July 23, 2020. Filed declaration August 21, 2020. Filed expert report April 16, 2021. Deposition June 3, 2021.

- Testifying Expert in Yellowdog Partners, LP, Individually and on Behalf of All Others Similarly Situated, vs. CURO Group Holdings Corp., *et al*., Civil Action No. 2:18-cv-02662-JWL-KGG, United States District Court for the District of Kansas, Kansas City. Filed expert report May 18, 2020.

- Testifying Expert in Julian Keippel, Individually and On Behalf of All Others Similarly Situated, vs. Health Insurance Innovations, Inc., Gavin Southwell, and Michael D. Hershberger, No. 8:19-CV-00421-WFJ-CPT, United States District Court Middle District of Florida Tampa Division. Filed expert report May 21, 2020. Deposition June 15, 2020.

- Testifying Expert in In Re Perrigo Company plc Securities Litigation, No: 1:19-cv-00070-DLC, United States District Court for the Southern District of New York. Filed expert report July 10, 2020. Deposition August 4, 2020. Filed expert report October 6, 2020. Filed expert rebuttal reply report December 4, 2020. Deposition March 4, 2021.

- Testifying Expert in Plymouth County Retirement System, Individually and On Behalf of All Others Similarly Situated, vs. GTT Communications, Inc., Richard D. Calder, Jr., Chris Mckee, Michael Sicoli, And Gina Nomellini, Case No. 1:19-cv-00982-CMH-MSN, United States District Court for the Eastern District of Virginia Alexandria Division. Filed expert report August 7, 2020. Filed expert report September 25, 2020.

- Testifying Expert in Thomas W. Luczak, Individually and On Behalf of All Others Similarly Situated, vs. National Beverage Corp., Nick A. Caporella, and George R. Bracken, Case No. 0:18-cv-61631-KMM, United States District Court for the Southern District of Florida. Filed expert report September 25, 2020. Deposition November 5, 2020.

- Expert Declaration in In re: PG&E Corporation – and – Pacific Gas and Electric Company Debtors, Case No. 19-30088 (DM), United States Bankruptcy Court for the Northern District of California, San Francisco Division. Filed declaration September 28, 2020.

- Testifying Expert in Oklahoma Police Pension Fund and Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Teligent, Inc. and Jason Grenfell-Gardner, Defendants, Case No. 1:19-cv-03354-VM, United States District Court for the Southern District of New York. Filed expert report September 30, 2020. Deposition March 11, 2021.

- Testifying Expert in John Utesch, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Lannett Company, Inc., Arthur P. Bedrosian, and Martin P. Galvan, Defendants, Civil Action No. 2:16-cv-05932-WB, United States District Court for the Eastern District of Pennsylvania. Filed expert report October 1, 2020. Deposition December 10, 2020. Filed expert rebuttal report on May 13, 2021. Hearing testimony July 27, 2021. Filed expert report May 8, 2024. Deposition August 6, 2024.

- Testifying Expert in City of Warren Police and Fire Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. World Wrestling Entertainment, Inc., Vincent K. McMahon, George A. Barrios and Michelle D. Wilson, Defendants, Civil Action No. 1:20-cv-02031-JSR, United States District Court for the Southern District of New York. Filed expert report on October 6, 2020. Deposition October 14, 2020.

- Testifying Expert in Employees' Retirement System of the Puerto Rico Electric Power Authority, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Conduent Inc., Ashok Vemuri, and Brian Webb-Walsh, Defendants, Case No. 2:19-cv-08237-SDW, United States District Court for the District of New Jersey. Filed expert report on December 7, 2020. Deposition December 22, 2020.

- Testifying Expert in The Police Retirement System of St. Louis, Individually and On Behalf of All Others Similarly Situated, Plaintiff, v. Granite Construction Incorporated, James H. Roberts, Jigisha Desai, and Laurel J. Krzeminski, Defendants, Case No. 3:19-cv-04744-WHA, United States District Court for the Northern District of California. Filed expert report on November 25, 2020. Filed declaration re: Plan of Allocation May 25, 2021.

- Testifying Expert in Plumbers & Pipefitters National Pension Fund and Juan Francisco Nieves, as Trustee of the Gonzalez Coronado Trust, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, v. Kevin Davis and Amir Rosenthal (Performance Sports Group Ltd.), Defendants, Case No.: 1:16-CV-3591-GHW, United States District Court for the Southern District of New York. Filed expert report on December 18, 2020. Deposition February 5, 2021. Filed expert rebuttal report on April 6, 2021. Filed declaration re: Plan of Allocation January 21, 2022.

- Testifying Expert in Mayuko Holwill, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. AbbVie Inc., Richard A. Gonzalez, and William J. Chase, Defendants, Case No. 1:18-cv-6790, United States District Court for the Northern District of Illinois. Filed expert report on February 1, 2021. Filed expert rebuttal report on September 20, 2021. Filed expert report on July 6, 2023. Filed expert rebuttal report on February 6, 2024.

- Testifying Expert in Oklahoma Firefighters Pension and Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Newell Brands Inc., Michael B. Polk, John K. Stipancich, Scott H. Garber, Bradford R. Turner, Michael T. Cowhig, Thomas E. Clarke, Kevin C. Conroy, Scott S. Cowen, Domenico De Sole, Cynthia A. Montgomery, Christopher D. O'Leary, Jose Ignacio Perez-Lizaur, Steven J. Strobel, Michael A. Todman, and Raymond G. Viault, Defendants, Case No: HUD-L-3492-18, Superior Court of New Jersey Law Division (Hudson County). Filed expert report on May 3, 2021. Filed expert rebuttal report on June 15, 2021. Deposition July 21, 2021. Filed expert supplemental reply report on February 4, 2022. Deposition March 15, 2022.

- Testifying Expert in Carmignac Gestion, S.A., Mason Capital L.P., et al., Pentwater Equity Opportunities Master Fund LTD., et al., First Manhattan Co., Nationwide Mutual Funds, on behalf of its series Nationwide S&P 500 Index Fund, et. al., WCM Alternatives: Event-Driven Fund, et al., Hudson Bay Master Fund LTD., et al., Schwab Capital Trust on behalf of its series Schwab

S&P 500 Index Fund, et al., Sculptor Master Fund, LTD. f/k/a OZ Master Fund, Ltd., et al., Aberdeen Canada Funds – Global Equity Fund, a series of Aberdeen Canada Funds, et al., Discovery Global Citizens Master Fund, LTD., et al., York Capital Management, L.P., et al., Burlington Loan Management DAC, Universities Superannuation Scheme LTD., Principal Funds, Inc., et al., Kuwait Investment Authority et al., BlackRock Global Allocation Fund Inc., et al., Plaintiffs, vs. Perrigo Company PLC, et al, Defendants, Civil Action No(s): 17-10467 (MCA) (LDW), 18-1119 (MCA) (LDW), 18-1121 (MCA) (LDW), 18-2291 (MCA) (LDW), 18-15382 (MCA) (LDW), 18-16204 (MCA) (LDW), 18-16206 (MCA) (LDW), 19-3973 (MCA) (LDW), 19-4900 (MCA) (LDW), 19-6560 (MCA) (LDW), 19-21502 (MCA) (LDW), 19-21732 (MCA) (LDW), 20-1484 (MCA) (LDW), 20-2262 (MCA) (LDW), 20-2410 (MCA) (LDW), 20-3431 (MCA) (LDW), 20-4748 (MCA) (LDW), United States District Court for the District of New Jersey. Filed expert report on June 23, 2021. Filed expert report on September 29, 2021. Deposition October 26, 2021.

- Testifying Expert in In Re Nielsen Holdings PLC Securities Litigation, Case No. 18-CV-07143-JMF, United States District Court Southern District of New York. Filed expert report on July 14, 2021. Deposition September 30, 2021. Filed expert report December 17, 2021.

- Testifying Expert in Allegheny County Employees Retirement System et al. v. Energy Transfer LP et al., Case No. 2:20-cv-00200-GAM, United States District Court for the Eastern District of Pennsylvania. Filed expert report on September 17, 2021. Deposition November 18, 2021. Filed expert rebuttal report on April 22, 2022. Filed expert report on September 15, 2023. Deposition December 13, 2023.

- Testifying Expert in Julia Junge and Richard Junge et al. v. Geron Corporation et al., Case No. 3:20-cv-00547-WHA, United States District Court for the Northern District of California, San Francisco Division. Filed expert report on September 30, 2021. Deposition October 15, 2021. Filed expert rebuttal report on November 4, 2021.

- Testifying Expert in In Re MINDBODY, Inc. Securities Litigation, Civil Action No. 1:19-cv-08331-VEC, United States District Court Southern District of New York. Filed expert report on October 15, 2021.

- Testifying Expert in Plymouth County Retirement System and Oklahoma Police Pension and Retirement System, Individually and On Behalf of All Others Similarly Situated, v. Evolent Health, Inc., Frank Williams, Nicholas McGrane, Seth Blackley, Christie Spencer, and Steven Wigginton, Case No. 1:19-cv-01031, United States District Court Eastern District of Virginia, Alexandria Division. Filed expert report on October 19, 2021. Filed expert report on April 8, 2022. Deposition May 9, 2022. Filed expert report on May 27, 2022. Deposition June 22, 2022.

- Testifying Expert in In re Uniti Group Inc. Securities Litigation, Case No. 4:19-cv-00756-BSM, United States District Court Eastern District of Arkansas, Central Division. Filed expert report on October 25, 2021. Deposition December 6, 2021. Filed declaration re: expert report on January 24, 2022. Filed expert rebuttal report on February 22, 2022.

- Testifying Expert in David Kanefsky, Individually and On Behalf of All Others Similarly Situated, v. Honeywell International Inc., Darius Adamczyk, and Thomas A. Szlosek, Civ. No. 2:18-15536-WJM, United States District Court for the District of New Jersey. Filed expert report on November 1, 2021.

- Testifying Expert in In Re Pareteum Securities Litigation, No. 1:19-cv-09767-AKH-GWG, United States District Court for the Southern District of New York. Filed expert report December 1, 2021.

- Expert Declaration in Arkansas Teacher Retirement System and John A. Prokop, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, vs. OSI Systems, Inc., Deepak Chopra, Alan Edrick, and Ajay Mehra, Defendants, Case No. 17-cv-08841-VAP-SKx, United States District Court for the Central District of California, Western Division. Filed declaration re: Plan of Allocation and aggregate damages December 10, 2021.

- Testifying Expert in Boston Retirement System, Individually and On Behalf of All Others Similarly Situated v. Alexion Pharmaceuticals, Inc., Leonard Bell, David L. Hallal, Vikas Sinha, David Brennan, David J. Anderson, Ludwig Hantson, and Carsten Thiel, Defendants, Civ. No. 3:16-cv-2127(AWT), United States District Court for the District of Connecticut. Filed expert report December 15, 2021. Deposition March 8, 2022. Filed expert rebuttal report June 17, 2022.

- Testifying Expert In Re Aphria, Inc. Securities Litigation, No. 1:18-cv-11376-GBD, United States District Court Southern District of New York. Filed declaration January 28, 2022 re: class certification. Filed expert report January 28, 2022. Deposition May 19, 2022.

- Testifying Expert in Discovery Global Citizens Master Fund, Ltd., et al., MSD Torchlight Partners, L.P., et al., Incline Global Master LP., et al., Valic Company I, et al., Okumus Opportunistic Value Fund, Ltd., The Boeing Company Employee Retirement Plans Master Trust, et al., Första Ap-Fonden, et al., GMO Trust, et al., Hound Partners Offshore Fund, LP, et al., Colonial First State Investments Limited As Responsible Entity For Commonwealth Global Shares Fund 1, et al., Bharat Ahuja, et al., Brahman Partners II, L.P., et al., The Prudential Insurance Company Of America, et al., 2012 Dynasty UC LLC, et al., BlackRock Global Allocation Fund, Inc., et al., Northwestern Mutual Life Insurance Co., et al., Bahaa Aly, et al., James M. Templeton, et al., GIC Private LTD., et al., USAA MUTUAL FUNDS TRUST On Behalf Of Its Series USAA Aggressive Growth Fund, et al., Maverick Select Fund, Ltd., et al., Plaintiffs, vs. Valeant Pharmaceuticals International, Inc. et al., Defendants, Civil Action No(s): 3:16-cv-07321-MAS-LHG, 3:16-cv-07324-MAS-LHG, 3:16-cv-07494, 3:16-cv-07496, 3:17-cv-06513-MAS-LHG, 3:17-cv-07636-MAS-LHG, 3:17-cv-12088-MAS-LHG, 3:18-cv-00089, 3:18-cv-08705-MAS-LHG, 3:18-cv-00383-MAS-LHG, 3:18-cv-00846-MAS-LHG, 3:18-00893, 3:18-cv-01223-MAS-LHG, 3:18-cv-08595-MAS-LHG, 3:18-cv-00343-MAS-LHG, 3:18-cv-15286-MAS-LHG, 3:18-cv-17393, 3:20-cv-05478, 3:20-cv-07460-MAS-LHG, 3:20-cv-07462-MAS-LHG, 3:20-02190-MAS-LHG, United States District Court for the District of New Jersey. Filed expert report February 2, 2022. Filed expert rebuttal report on May 9, 2022. Deposition June 3, 2022. Filed declaration September 28, 2022 (related only to 3:20-cv-02190-MAS-LHG). Filed declaration November 10, 2022.

- Testifying Expert in Roei Azar, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Grubhub Inc., et al., Defendants, Case No. 1:19-cv-07665, United States District

Court Northern District of Illinois Eastern Division. Filed expert report June 1, 2022. Deposition July 14, 2022.

- Testifying Expert in In Re Peabody Energy Corp. Securities Litigation, Civil Action No. 1:20-cv-08024-PKC, United States District Court Southern District of New York. Filed expert report July 15, 2022.

- Testifying Expert in BlackRock Asset Management Canada Limited, et al., Plaintiffs, v. Valeant Pharmaceuticals International, Inc. (n/k/a Bausch Health Companies Inc.), et al. Defendants, Nos.: 500-11-054155-185, 500-17-103749-183, and California State Teachers' Retirement System, Plaintiff, v. Bausch Health Companies Inc. (f/k/a Valeant Pharmaceuticals International, Inc.), et al., Defendants, Nos.: 500-11-055722-181, 500-11-055722-181, Canada Superior Court, Province of Québec, District of Montreal. Filed expert report September 30, 2022. Filed expert rebuttal report on July 10, 2023.

- Testifying Expert in Sheet Metal Workers National Pension Fund and International Brotherhood of Teamsters Local No. 710 Pension Fund, individually and as Lead Plaintiffs on behalf of all others similarly situated, and International Union of Operating Engineers Pension Fund of Eastern Pennsylvania and Delaware, individually and as Named Plaintiff, on behalf of all others similarly situated, Plaintiffs v. Bayer Aktiengesellschaft, Werner Baumann, Werner Wenning, Liam Condon, Johannes Dietsch, and Wolfgang Nickl, Defendants, No. 3:20-cv-04737-RS, Northern District of California, San Francisco Division. Filed expert report October 28, 2022. Deposition December 21, 2022. Filed expert rebuttal report on March 21, 2023. Filed expert report June 11, 2024. Filed expert reply report on November 8, 2024. Deposition December 3, 2024.

- Testifying Expert in In Re: Maxar Technologies, Inc. Shareholder Litigation, Lead Case No.:19CV357070, Superior Court of the State of California, County of Santa Clara. Filed expert report December 12, 2022.

- Testifying Expert in In Re FibroGen Inc., Securities Litigation, Case No. 3:21-cv-02623-EMC, United States District Court Northern District of California. Filed expert report January 27, 2023. Deposition April 4, 2023.

- Testifying Expert in Indiana Public Retirement System and Public School Teachers' Pension and Retirement Fund of Chicago, individually and on behalf of all others similarly situated, Plaintiffs, v. Pluralsight, Inc.; Aaron Skonnard; and James Budge, Defendants, Case No. 1:19-cv-00128, United States District Court for the District of Utah. Filed expert report March 3, 2023.

- Testifying Expert in Sothinathan Sinnathurai, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Novavax, Inc., Stanley C. Erck, Gregory F. Covino, John J. Trizzino, and Gregory M. Glenn, Defendants, Case 8:21-cv-02910-TDC, United States District Court for the District of Maryland. Filed expert report March 16, 2023. Deposition September 14, 2023. Filed expert rebuttal report November 13, 2023.

- Testifying Expert in Meysam Moradpour, Individually and On Behalf of All Others Similarly Situated, v. Velodyne Lidar, Inc., Anand Gopalan, Andrew Hamer, James A. Graf, Michael Dee,

and Joseph B. Culkin, Case No. 3:21-CV-01486-SI, United States District Court Northern District of California San Francisco Division. Filed expert report March 20, 2023.

- Testifying Expert in In Re Boston Scientific Corporation Securities Litigation, Case No. 1:20-cv-12225-DPW, United States District Court District of Massachusetts. Filed expert report April 21, 2023. Filed declaration June 22, 2023.

- Testifying Expert in In Re Okta, Inc. Securities Litigation, Case 3:22-cv-02990-SI, United States District Court Northern District of California. Filed expert report August 18, 2023.

- Testifying Expert in Carl Shupe and Matthew Pearlman, Individually and on Behalf of All Others Similarly Situated, vs. Rocket Companies, Inc., Jay D. Farner, Julie R. Booth, Robert Dean Walters, Daniel Gilbert, and Rock Holdings Inc., Civ. No. 1:21-cv-11528, United States District Court Eastern District of Michigan, Southern Division. Filed expert report August 30, 2023. Deposition November 8, 2023. Filed expert rebuttal report on January 26, 2024. Filed expert report February 12, 2024. Deposition February 22, 2024. Filed expert rebuttal report on March 8, 2024. Filed expert report April 5, 2024. Deposition June 18, 2024.

- Testifying Expert in Richard R. Weston, Individually and on Behalf of All Others Similarly Situated, Plaintiff v. DocuSign, Inc., Daniel D. Springer, Michael J. Sheridan, Cynthia Gaylor, and Loren Alhadeff, Defendants, Case No. 3:22-cv-0084-WHO, United States District Court, Northern District of California, San Francisco Division. Filed expert report September 15, 2023. Deposition January 4, 2024. Filed expert rebuttal report on April 17, 2024.

- Testifying Expert in John Brazinsky, Individually and on behalf of all other similarly situated, Plaintiff, vs. AT&T Inc., Randall L. Stephenson, John T. Stankey, Pascal Desroches, and John Stephens, Defendants, Case No. 2:23-cv-04064-KM-JBC, United States District Court for the District of New Jersey. Filed declaration October 23, 2023.

- Testifying Expert in In Re Concho Resources Inc. Securities Litigation, No. 4:21-cv-02473, United States District Court Southern District of Texas, Houston Division. Filed expert report December 7, 2023. Filed expert rebuttal report on May 8, 2024.

- Testifying Expert in Reginald T Allison, Individually and on Behalf of All Others Similarly Situated, Plaintiff, vs. Oak Street Health, Inc., et al., Defendants, Case No. 1:22-cv-00149, United States District Court, Northern District of Illinois. Filed expert report December 15, 2023. Deposition January 23, 2024. Filed expert rebuttal report April 22, 2024.

- Testifying Expert in Boston Retirement System, et al., Plaintiff, v. Uber Technologies, Inc., et al., Defendants, Case No. 3:19-cv-06361, United States District Court, Northern District of California. Filed expert report February 1, 2024. Filed expert rebuttal report March 12, 2024. Deposition April 12, 2024.

- Testifying Expert in In Re Plantronics, Inc. Securities Litigation, Case No. 4:19-cv-07481-JST, United States District Court Northern District of California Oakland Division. Filed expert report February 8, 2024.

- Testifying Expert in Robert Ciarciello, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Bioventus Inc., Kenneth M. Reali, Mark L. Singleton, Gergory O. Anglum, and Susan M. Stalnecker, Defendants, Case No. 1:23-cv-00032-CCE-JEP, United States District Court Middle District of North Carolina. Filed expert report March 7, 2024. Filed expert report March 27, 2024. Deposition April 8, 2024. Filed expert rebuttal report May 10, 2024. Filed declaration re: Plan of Allocation August 5, 2024.

- Testifying Expert in Michael Pardi, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Tricida, Inc. and Gerritt Klaerner, Defendants. Case No. 4:21-cv-00076-HSG, United States District Court, Northern District of California. Filed expert report April 30, 2024. Filed expert rebuttal report August 15, 2024.

- Testifying Expert in Miriam Edwards, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. McDermott International, Inc., David Dickson, and Stuart Spence, Defendants. Case No. 4:18-cv-04330, United States Southern District Court, Southern District of Texas, Houston Division. Filed expert report April 30, 2024. Filed expert reply report September 30, 2024. Deposition October 4, 2024.

- Testifying Expert in Humberto Lozada and Oklahoma Firefighters Pension and Retirement System, Individually and on Behalf of All Others Similarly Situated, Plaintiffs, v. Taskus Inc., Bryce Maddock, Jaspar Weir, Balaji Sekar, Amit Dixit, Mukesh Mehta, Susir Kumar, Jacqueline D. Reses, and BCP FC Aggregator L.P., Defendants, United States District Court, Southern District of New York. Filed expert report May 10, 2024. Deposition June 20, 2024. Filed expert reply report August 23, 2024. Deposition September 13, 2024.

- Testifying Expert in John Harvey Schneider, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Natera, Inc., Steve Chapman, Michael Brophy, Matthew Rabinowitz, and Ramesh Hariharan, Defendants, Case No. 1:22-cv-00398-DAE, United States District Court, Western District of Texas. Filed expert report June 4, 2024. Deposition July 19, 2024. Filed expert reply report October 4, 2024.

- Testifying Expert in Stadium Capital LLC, on Behalf of All Others Similarly Situated, Plaintiff, v. Co-Diagnostics, Inc., Dwight H. Egan, and Brian L. Brown, Defendants, Case No.: 22-cv-6978 (AS), United States District Court, Southern District of New York. Filed expert report July 26, 2024. Filed expert report November 20, 2024.

- Testifying Expert In Re Barclays PLC Securities Litigation, Case No 1:22-cv-08172-KPF, United States District Court Southern District of New York. Filed expert report August 12, 2024.

- Testifying Expert In Re PG&E Corporation Securities Litigation, Civil Action No. 3:18-cv-03509-EJD, United States District Court Northern District of California San Francisco Division. Filed expert report November 6, 2024. Filed expert report December 13, 2024.

- Testifying Expert In Re The Honest Company, Inc. Securities Litigation, No. 2:21-CV-07405-MCS-AS, United States District Court Central District of California. Filed expert report November 18, 2024. Filed expert rebuttal report December 15, 2024.

- Testifying Expert in Albert Chow, Individually and on Behalf of All Others Similarly Situated, Plaintiff, v. Enochian Biosciences Inc., Mark Dybul, Rene Sindlev, and Carl Sandler, Defendants, Case No. 8:22-cv-01374-JWH-JDE, United States District Court Central District of California. Filed declaration re: Plan of Allocation December 9, 2024.

- Testifying Expert In Re The Boeing Company Securities Litigation, Civil Action No. 1:24-cv-00151-LMB-LRV, United States District Court Eastern District of Virginia Alexandria Division. Filed expert report December 13, 2024.

Experience in Labor Economics and Discrimination-Related Cases:

- Expert Consultant in various class action matters regarding race, age, or gender discrimination.

Selected Experience in Antitrust, General Damages, and Other Matters:

- Expert Consultant in high-profile antitrust matters in the computer and credit card industries.

- Served as neutral expert for mediator (Judge Daniel Weinstein) in allocating a settlement in an antitrust matter.

PUBLICATIONS:

Coffman, Chad and Mary Gregson, "Railroad Construction and Land Value." *Journal of Real Estate and Finance*, 16:2, pp. 191-204 (1998).

Coffman, Chad, Tara O'Neil, and Brian Starr, Ed. Richard D. Kahlenberg, "An Empirical Analysis of the Impact of Legacy Preferences on Alumni Giving at Top Universities," *Affirmative Action for the Rich: Legacy Preferences in College Admissions*; pp. 101-121 (2010).

PROFESSIONAL AFFILIATIONS:

Associate Member CFA Society of Chicago
Associate Member CFA Institute
Phi Beta Kappa

PERSONAL ACTIVITIES:

- Pro bono consulting for Cook County State's Attorney's Office.
- Pro bono consulting for Cook County Health & Hospitals System – Developed method for hospital to assess real-time patient level costs to assist in improving care for Cook County residents and prepare for implementation of Affordable Care Act.
- Pro bono consulting for Chicago Park District to analyze economic impact of park district assets and assist in developing strategic framework for decision-making.
- Volunteer for Chicago Food Depository.
- Volunteer for Habitat for Humanity ReStore.

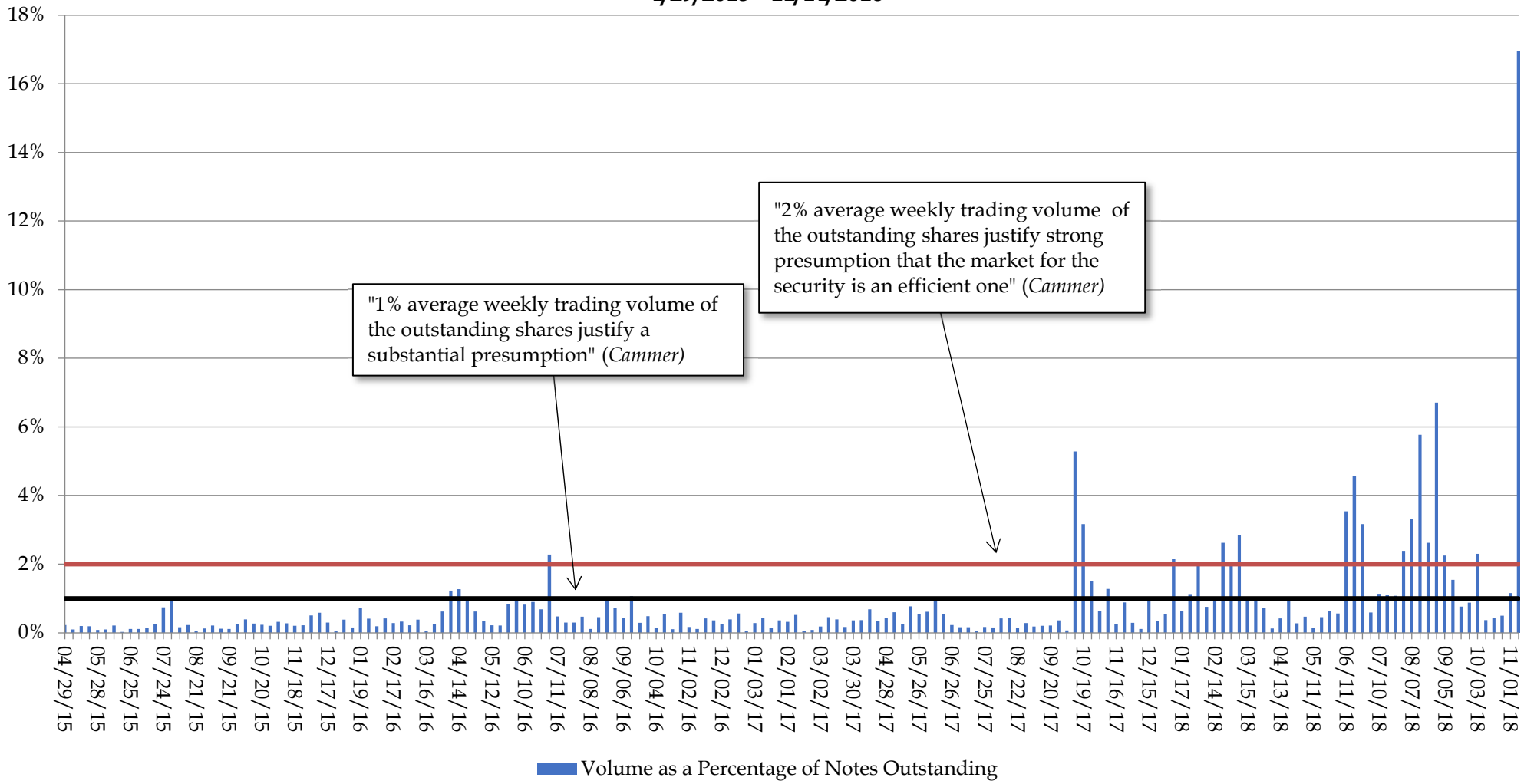
Appendix C

Summary of Relevant Publicly Traded Notes Held by Plaintiffs

#	CUSIP	Note Name	Issue Date	Maturity Date	Note Type	Original Amount Issued	Par Value	Coupon	Coupon Frequency	Coupon Currency
1	694308HY6	HY6	5/15/2018	12/1/2047	Plain Vanilla Fixed Coupon	$849,800,000	$1,000	3.950%	Semiannually	USD
2	694308HR1	HR1	12/1/2016	12/1/2046	Plain Vanilla Fixed Coupon	$600,000,000	$1,000	4.000%	Semiannually	USD
3	694308HN0	HN0	11/5/2015	3/15/2046	Plain Vanilla Fixed Coupon	$450,000,000	$1,000	4.250%	Semiannually	USD
4	694308HL4	HL4	11/6/2014	3/15/2045	Plain Vanilla Fixed Coupon	$600,000,000	$1,000	4.300%	Semiannually	USD
5	694308HH3	HH3	2/21/2014	2/15/2044	Plain Vanilla Fixed Coupon	$675,000,000	$1,000	4.750%	Semiannually	USD
6	694308HF7	HF7	11/12/2013	11/15/2043	Plain Vanilla Fixed Coupon	$500,000,000	$1,000	5.125%	Semiannually	USD
7	694308HD2	HD2	6/14/2013	6/15/2043	Plain Vanilla Fixed Coupon	$375,000,000	$1,000	4.600%	Semiannually	USD
8	694308HA8	HA8	8/16/2012	8/15/2042	Plain Vanilla Fixed Coupon	$350,000,000	$1,000	3.750%	Semiannually	USD
9	694308GZ4	GZ4	4/16/2012	4/15/2042	Plain Vanilla Fixed Coupon	$400,000,000	$1,000	4.450%	Semiannually	USD
10	694308GY7	GY7	12/1/2011	12/15/2041	Plain Vanilla Fixed Coupon	$250,000,000	$1,000	4.500%	Semiannually	USD
11	694308GS0	GS0	11/18/2009	1/15/2040	Plain Vanilla Fixed Coupon	$800,000,000	$1,000	5.400%	Semiannually	USD
12	694308GQ4	GQ4	3/6/2009	3/1/2039	Plain Vanilla Fixed Coupon	$550,000,000	$1,000	6.250%	Semiannually	USD
13	694308GM3	GM3	3/3/2008	2/15/2038	Plain Vanilla Fixed Coupon	$400,000,000	$1,000	6.350%	Semiannually	USD
14	694308GJ0	GJ0	3/13/2007	3/1/2037	Plain Vanilla Fixed Coupon	$950,000,000	$1,000	5.800%	Semiannually	USD
15	694308GE1	GE1	3/23/2004	3/1/2034	Plain Vanilla Fixed Coupon	$3,000,000,000	$1,000	6.050%	Semiannually	USD
16	694308JA6	JA6	8/6/2018	8/1/2028	Plain Vanilla Fixed Coupon	$300,000,000	$1,000	4.650%	Semiannually	USD
17	694308HW0	HW0	5/15/2018	12/1/2027	Plain Vanilla Fixed Coupon	$1,129,736,000	$1,000	3.300%	Semiannually	USD
18	694308HS9	HS9	3/10/2017	3/15/2027	Plain Vanilla Fixed Coupon	$400,000,000	$1,000	3.300%	Semiannually	USD
19	694308HP5	HP5	3/1/2016	3/1/2026	Plain Vanilla Fixed Coupon	$600,000,000	$1,000	2.950%	Semiannually	USD
20	694308HM2	HM2	6/12/2015	6/15/2025	Plain Vanilla Fixed Coupon	$600,000,000	$1,000	3.500%	Semiannually	USD
21	694308HK6	HK6	8/18/2014	8/15/2024	Plain Vanilla Fixed Coupon	$350,000,000	$1,000	3.400%	Semiannually	USD
22	694308HG5	HG5	2/21/2014	2/15/2024	Plain Vanilla Fixed Coupon	$450,000,000	$1,000	3.750%	Semiannually	USD
23	694308HE0	HE0	11/12/2013	11/15/2023	Plain Vanilla Fixed Coupon	$300,000,000	$1,000	3.850%	Semiannually	USD
24	694308HZ3	HZ3	8/6/2018	8/1/2023	Plain Vanilla Fixed Coupon	$500,000,000	$1,000	4.250%	Semiannually	USD
25	694308HC4	HC4	6/14/2013	6/15/2023	Plain Vanilla Fixed Coupon	$375,000,000	$1,000	3.250%	Semiannually	USD
26	694308HB6	HB6	8/16/2012	8/15/2022	Plain Vanilla Fixed Coupon	$400,000,000	$1,000	2.450%	Semiannually	USD
27	694308GW1	GW1	9/12/2011	9/15/2021	Plain Vanilla Fixed Coupon	$250,000,000	$1,000	3.250%	Semiannually	USD
28	694308GV3	GV3	5/13/2011	5/15/2021	Plain Vanilla Fixed Coupon	$300,000,000	$1,000	4.250%	Semiannually	USD
29	694308GT8	GT8	9/15/2010	10/1/2020	Plain Vanilla Fixed Coupon	$800,000,000	$1,000	3.500%	Semiannually	USD

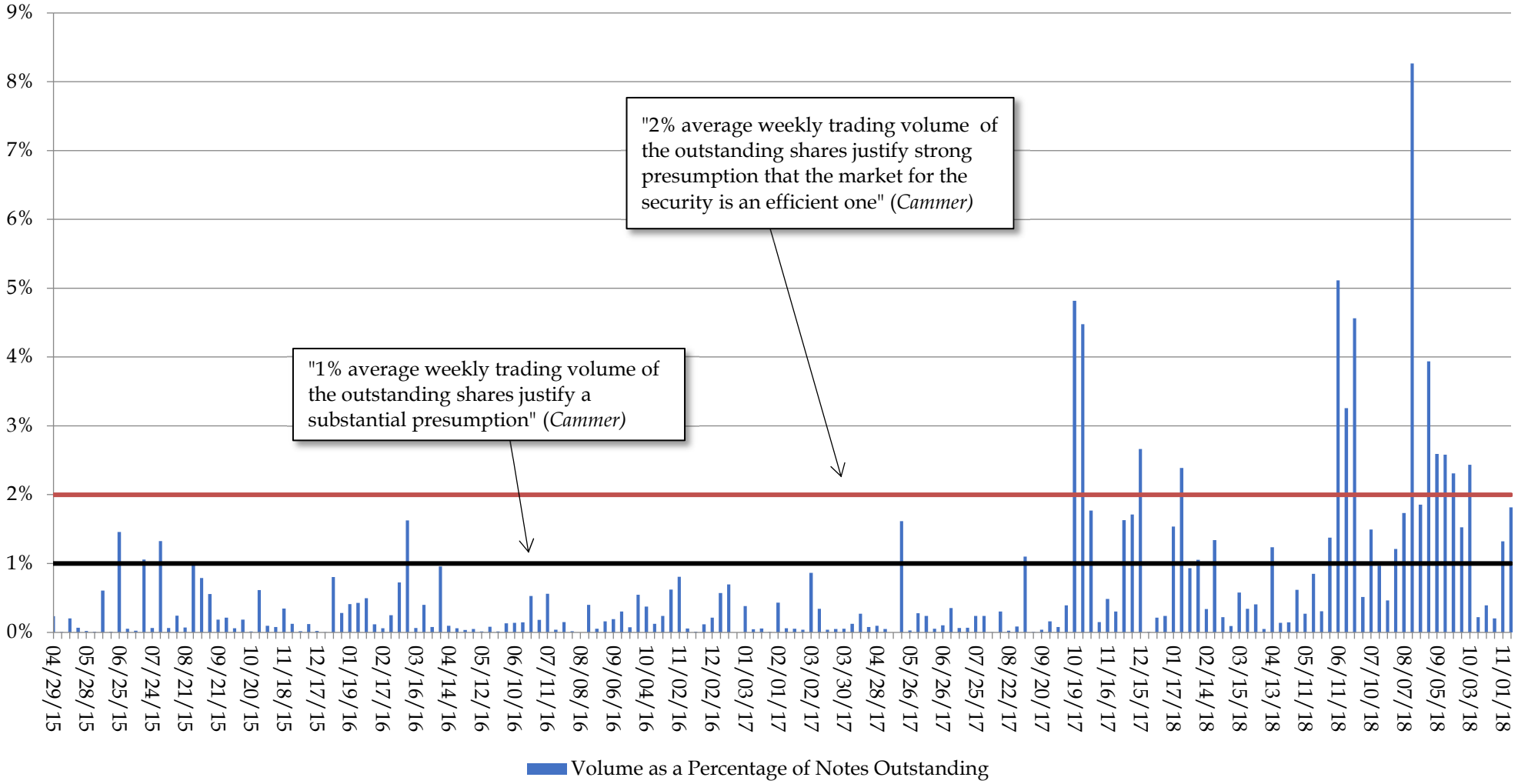
Sources: Complaint, LSEG Workspace (previously Eikon).

Appendix D
PG&E 6.05% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GE1
4/29/2015 - 11/14/2018



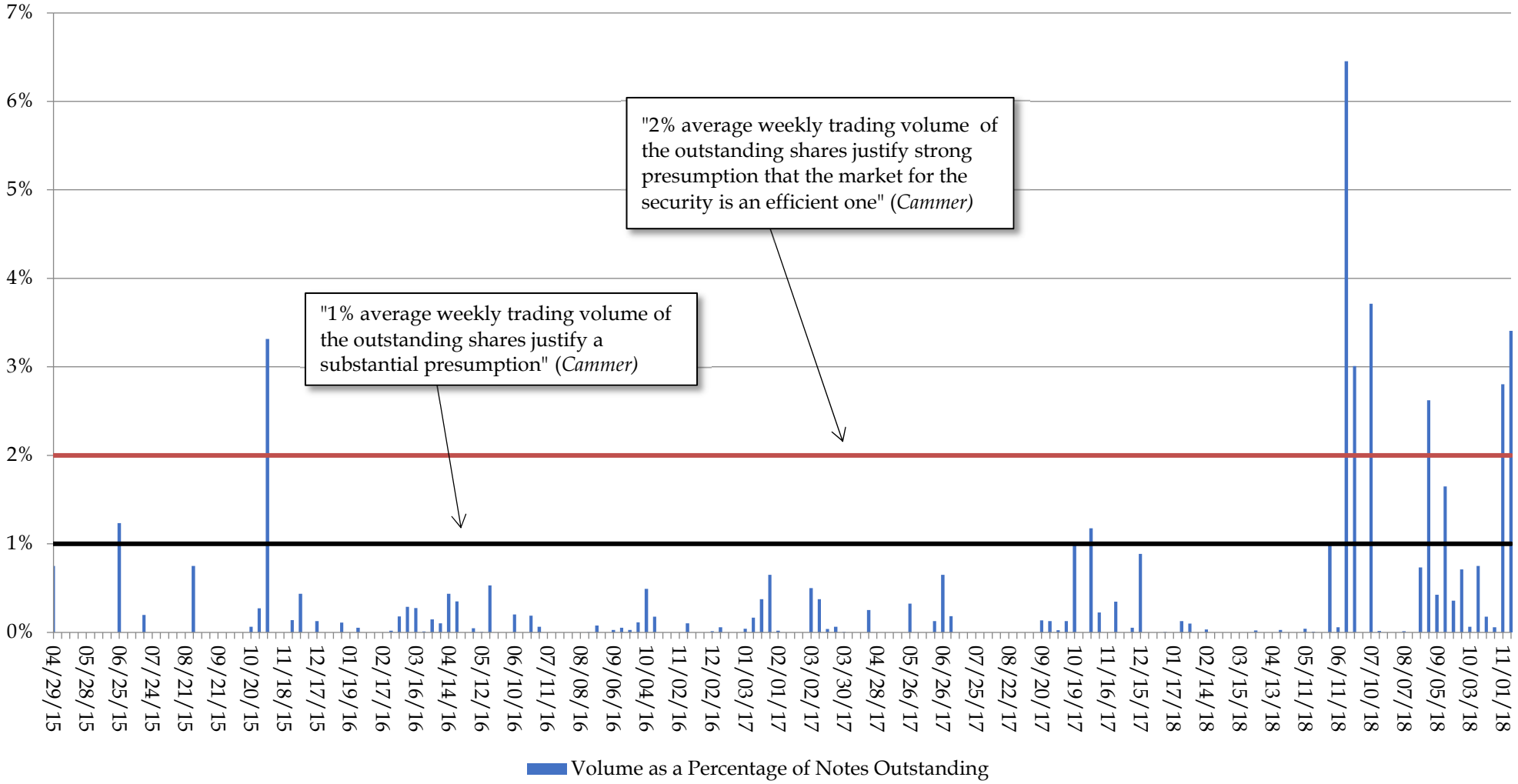
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 5.80% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GJ0
4/29/2015 - 11/14/2018



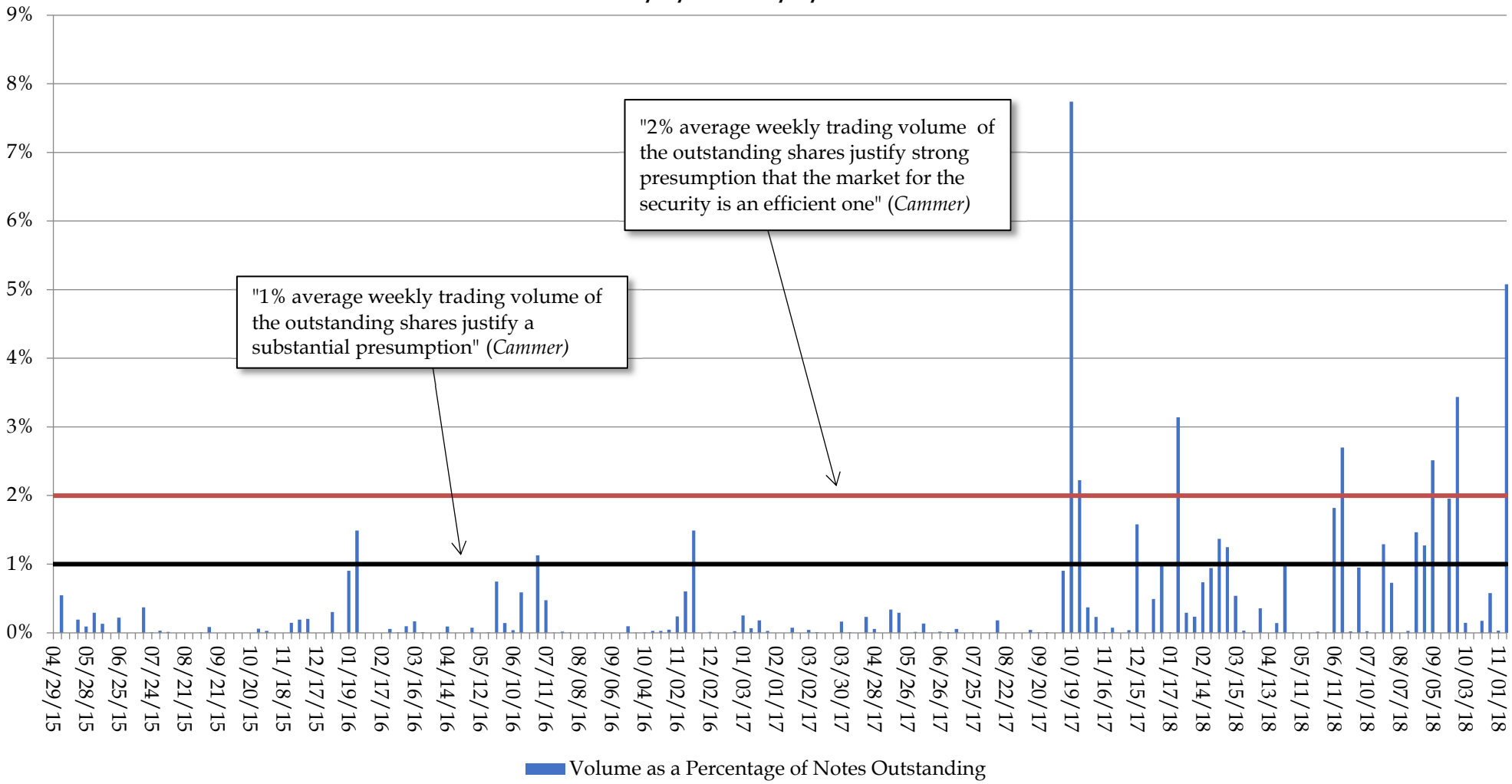
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 6.35% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GM3
4/29/2015 - 11/14/2018



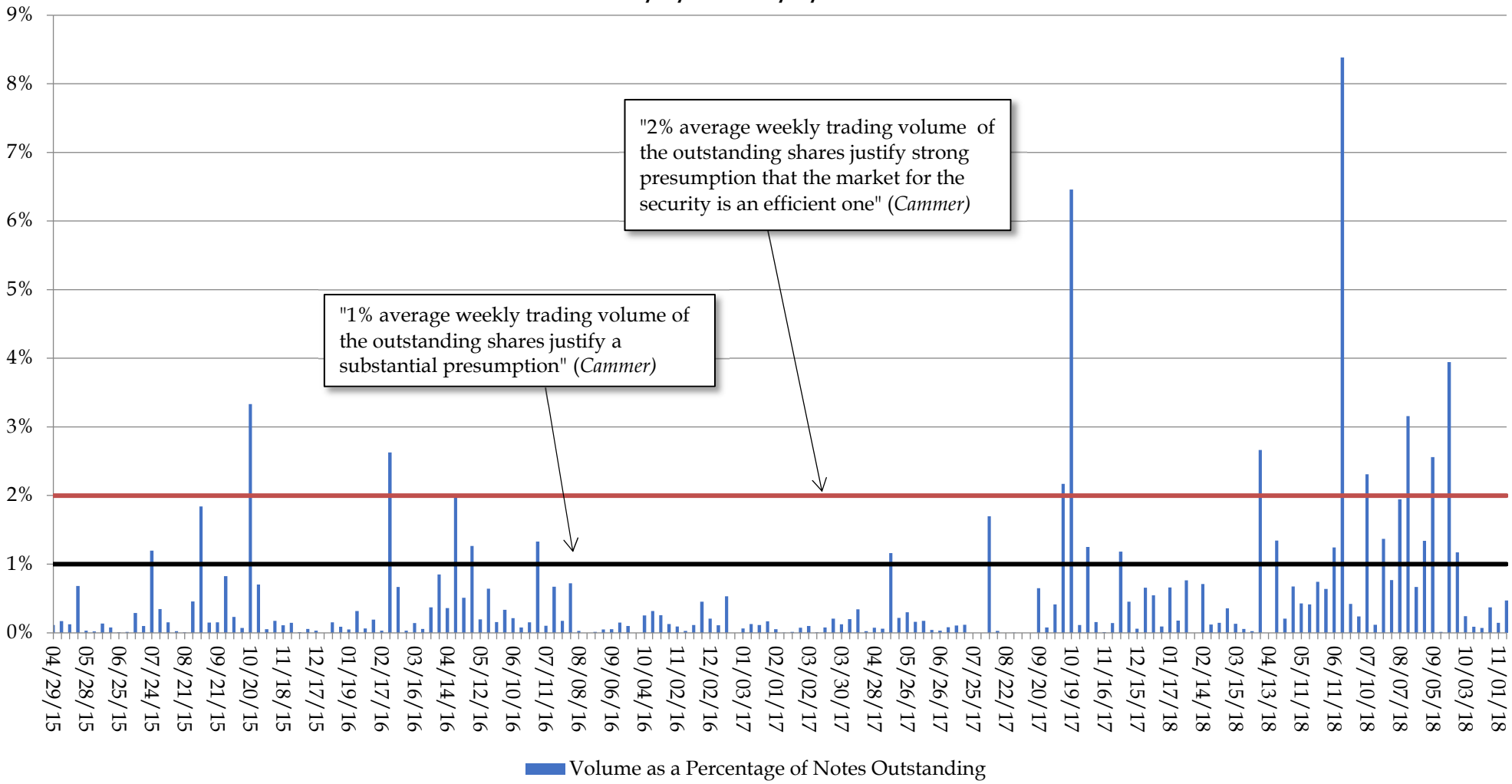
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 6.25% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GQ4
4/29/2015 - 11/14/2018



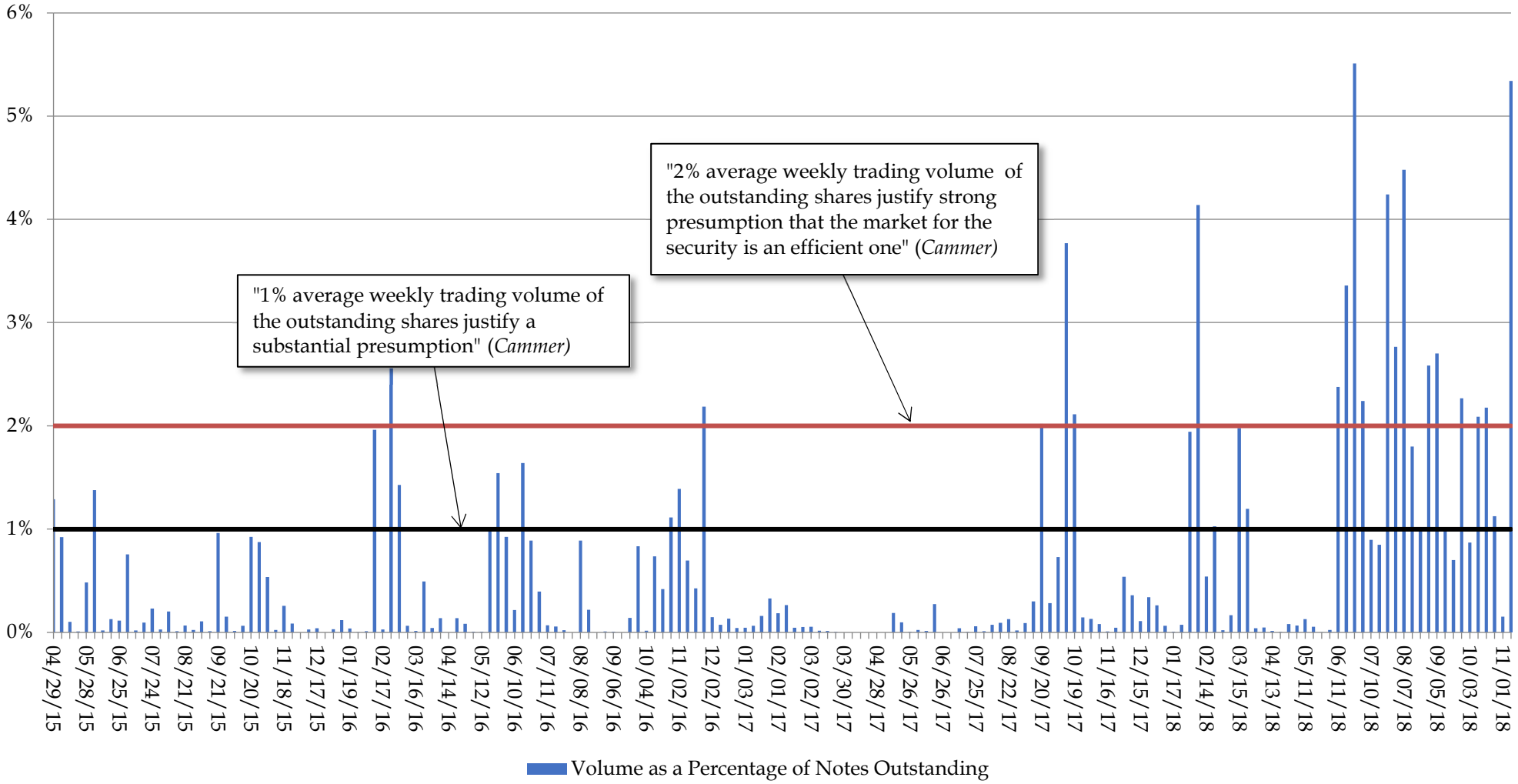
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 5.40% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GS0
4/29/2015 - 11/14/2018



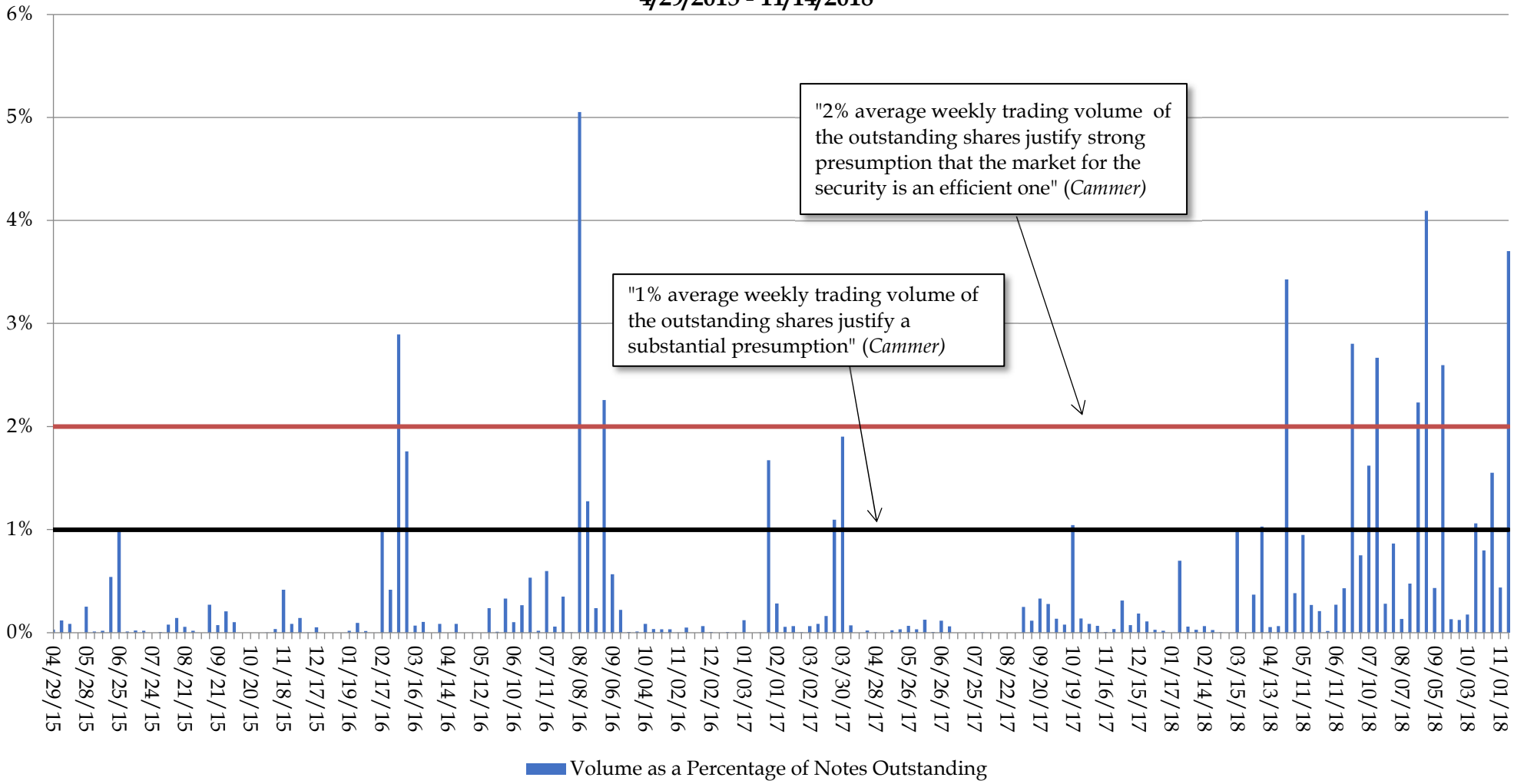
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.50% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GT8
4/29/2015 - 11/14/2018



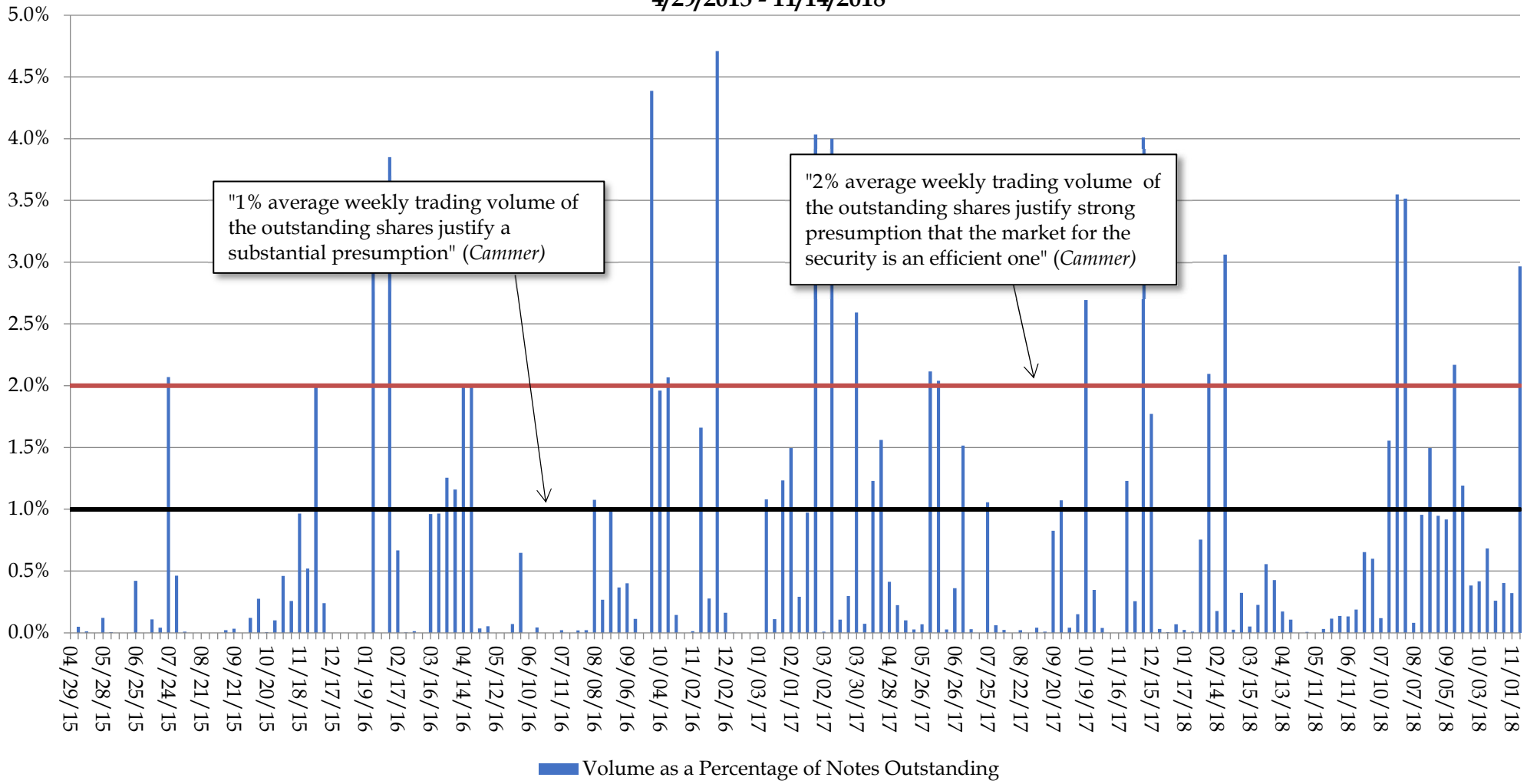
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.25% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308GV3
4/29/2015 - 11/14/2018



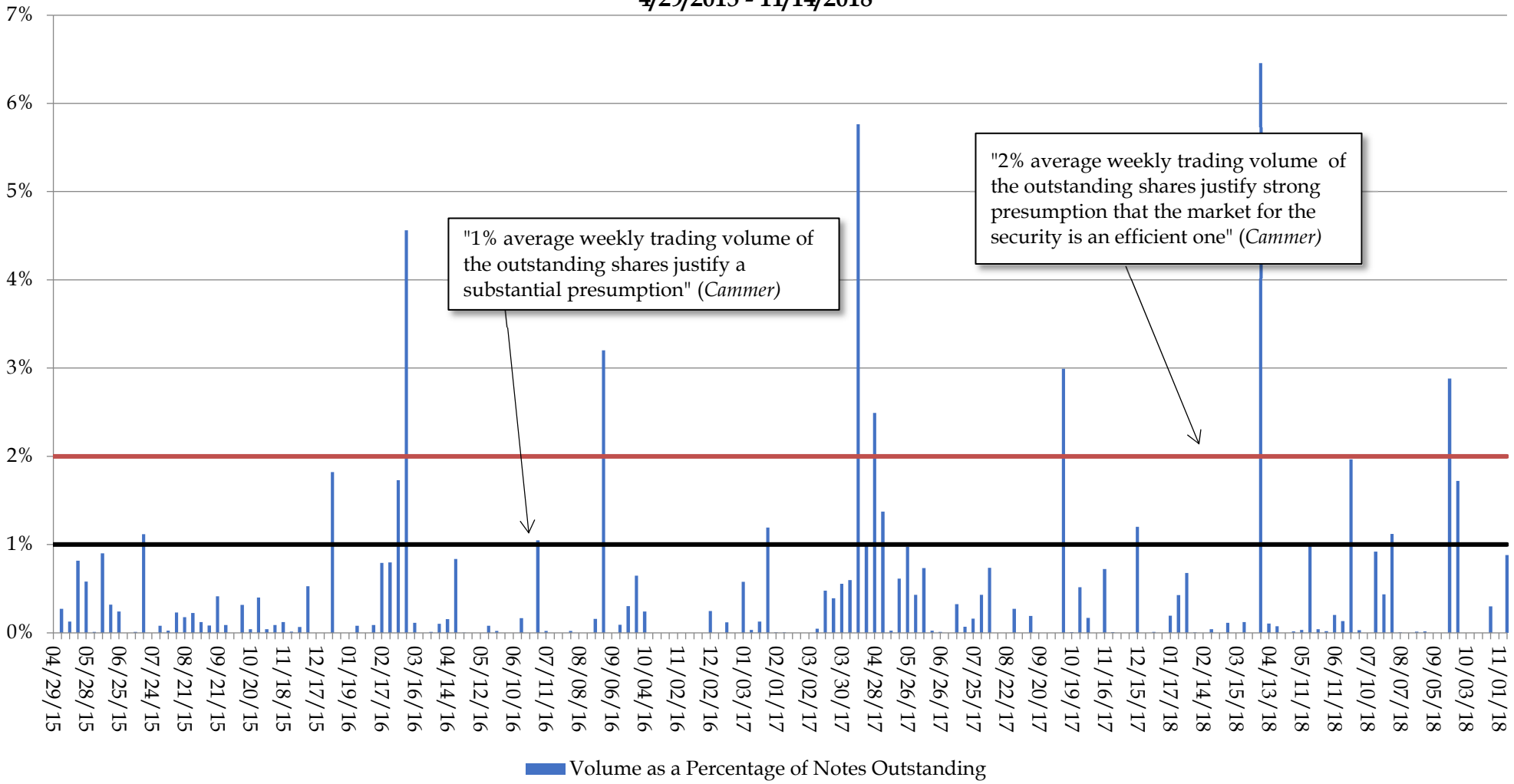
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.25% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308GW1
4/29/2015 - 11/14/2018



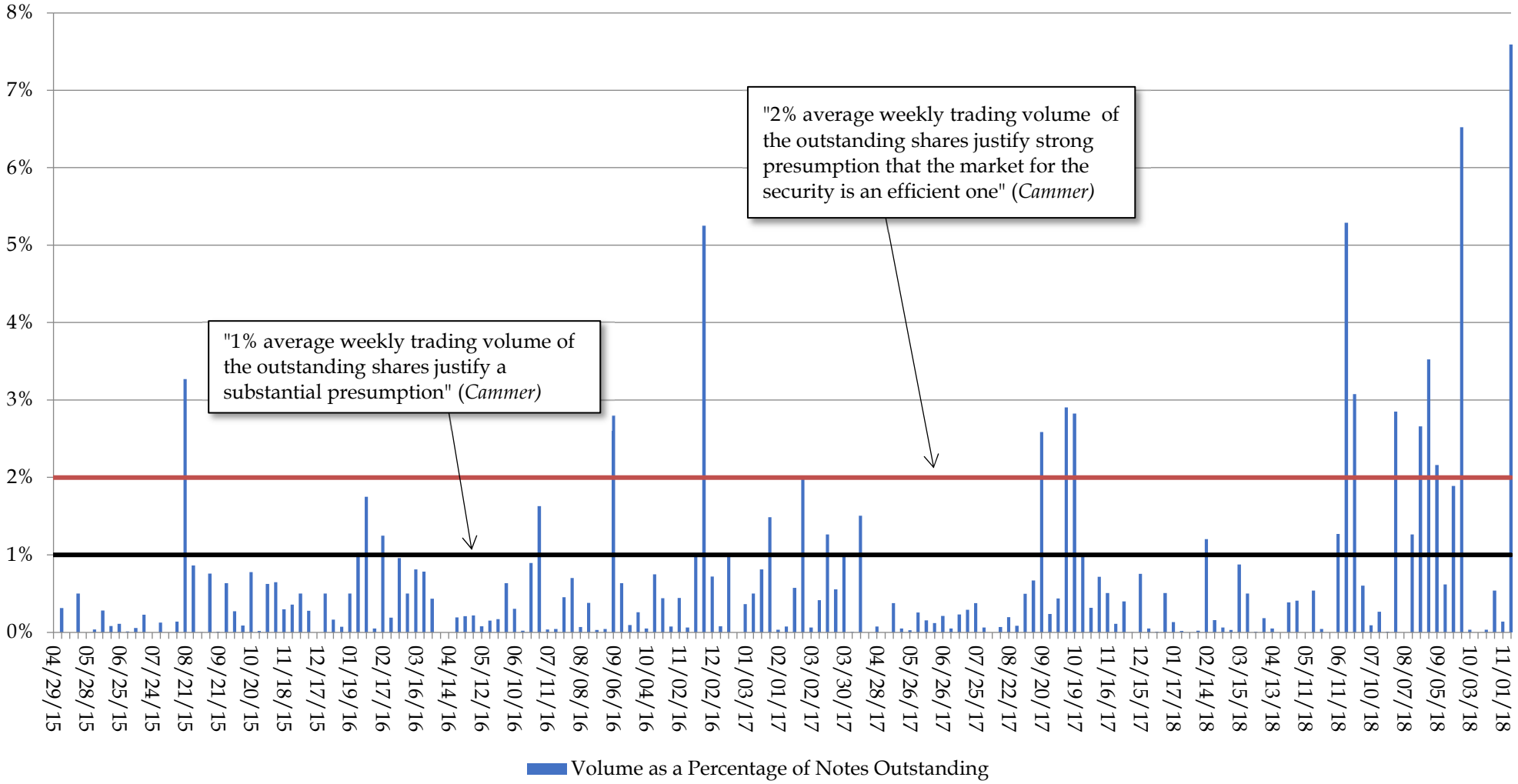
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.50% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308GY7
4/29/2015 - 11/14/2018



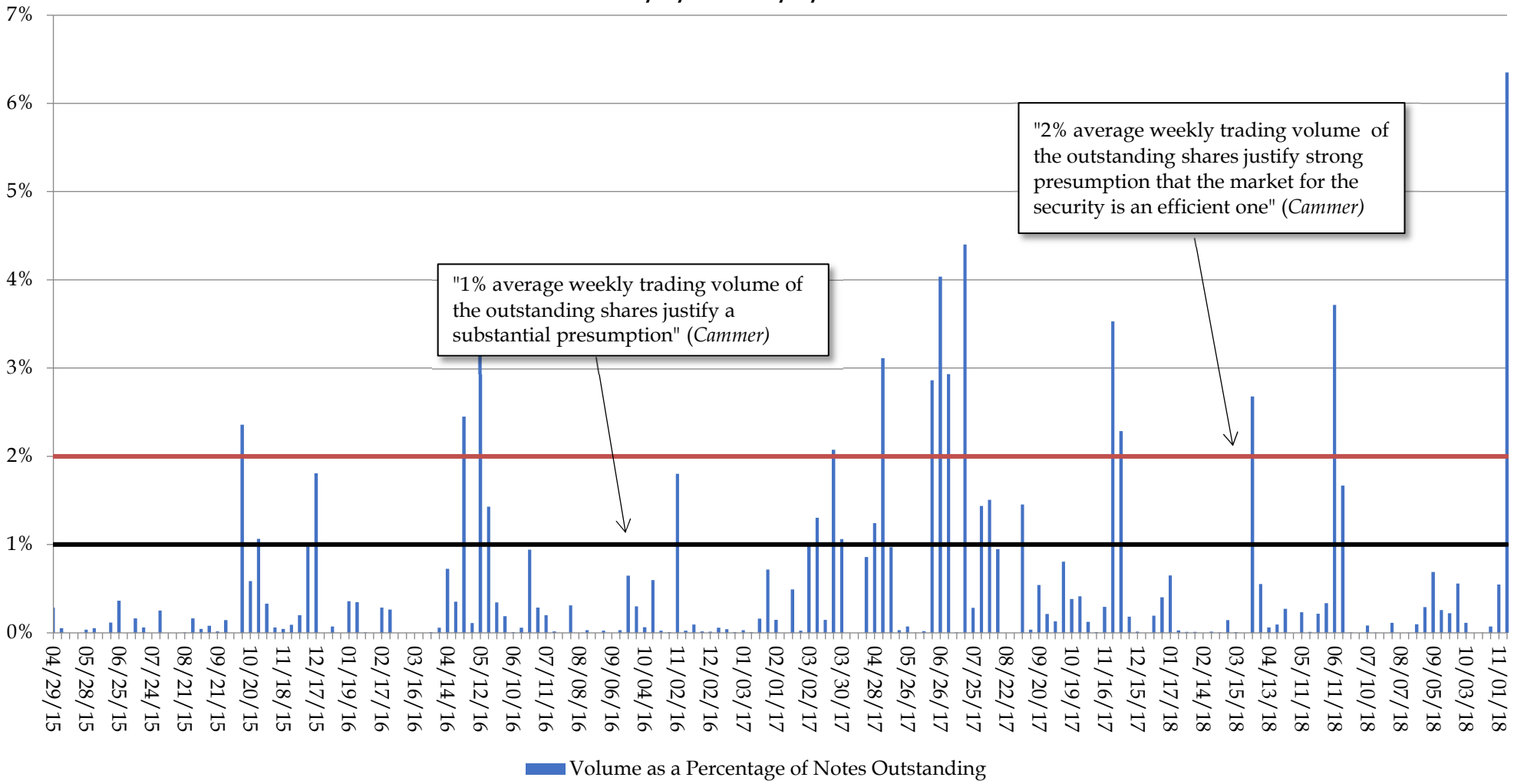
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.45% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308GZ4
4/29/2015 - 11/14/2018



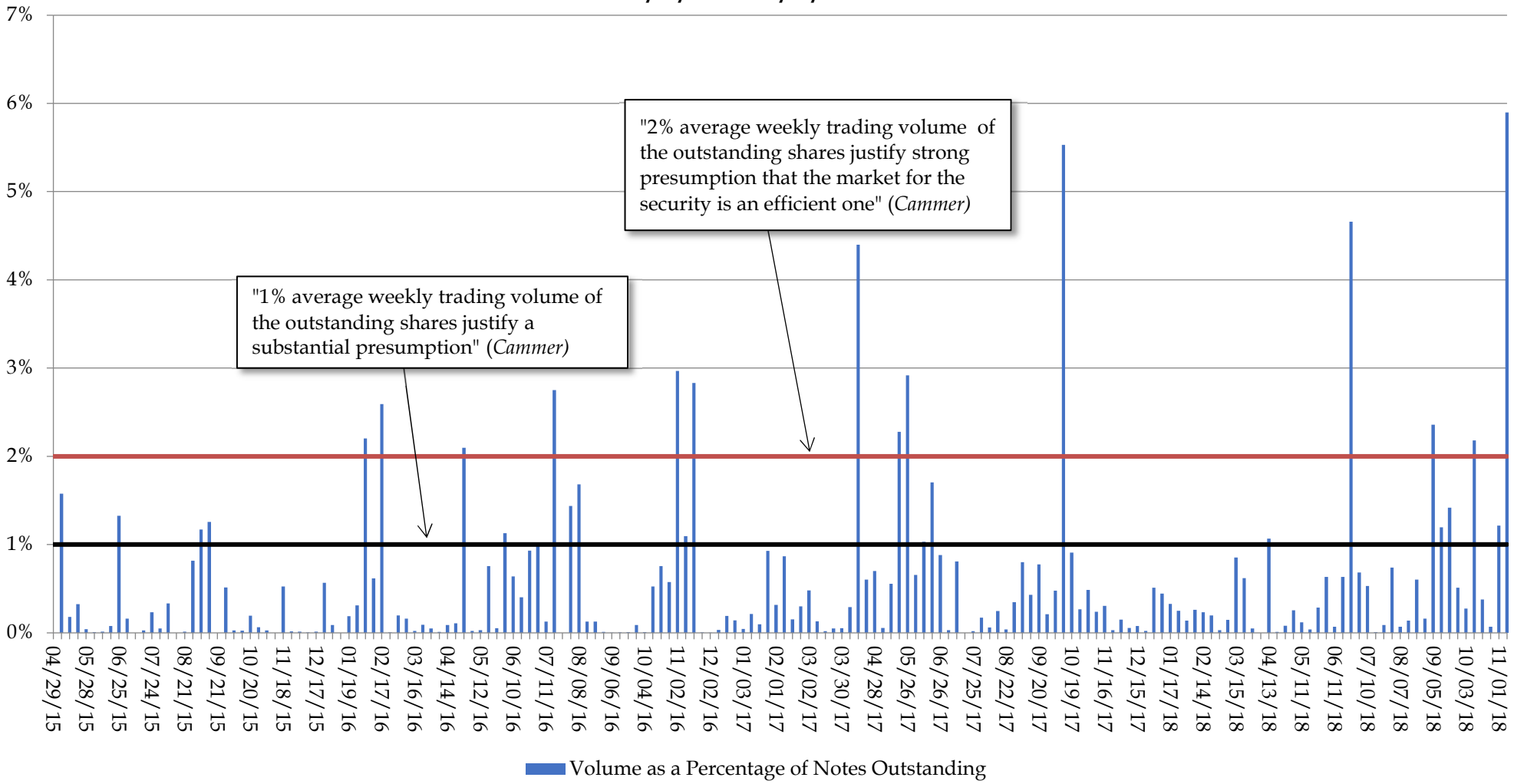
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.75% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HA8
4/29/2015 - 11/14/2018



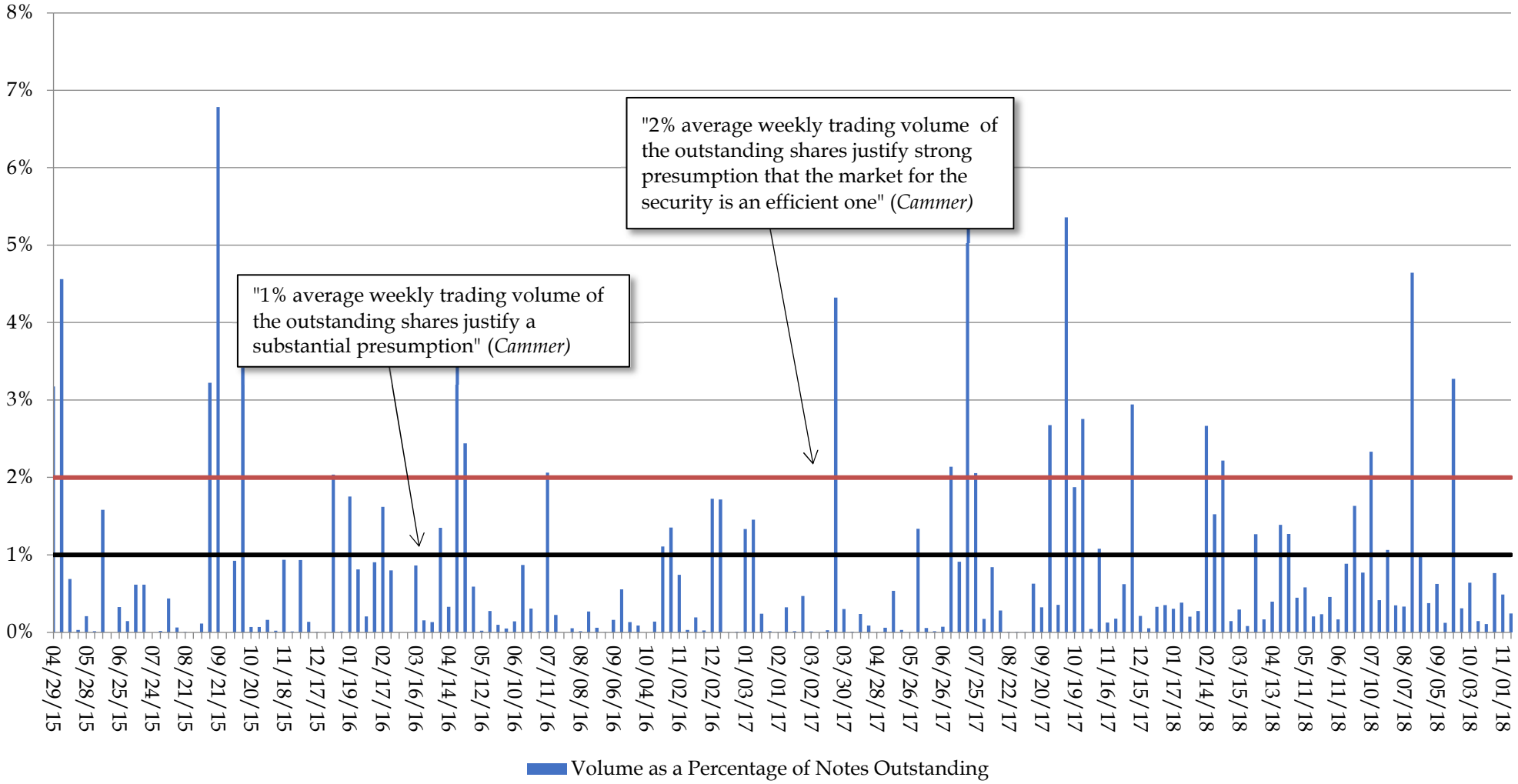
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 2.45% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HB6
4/29/2015 - 11/14/2018



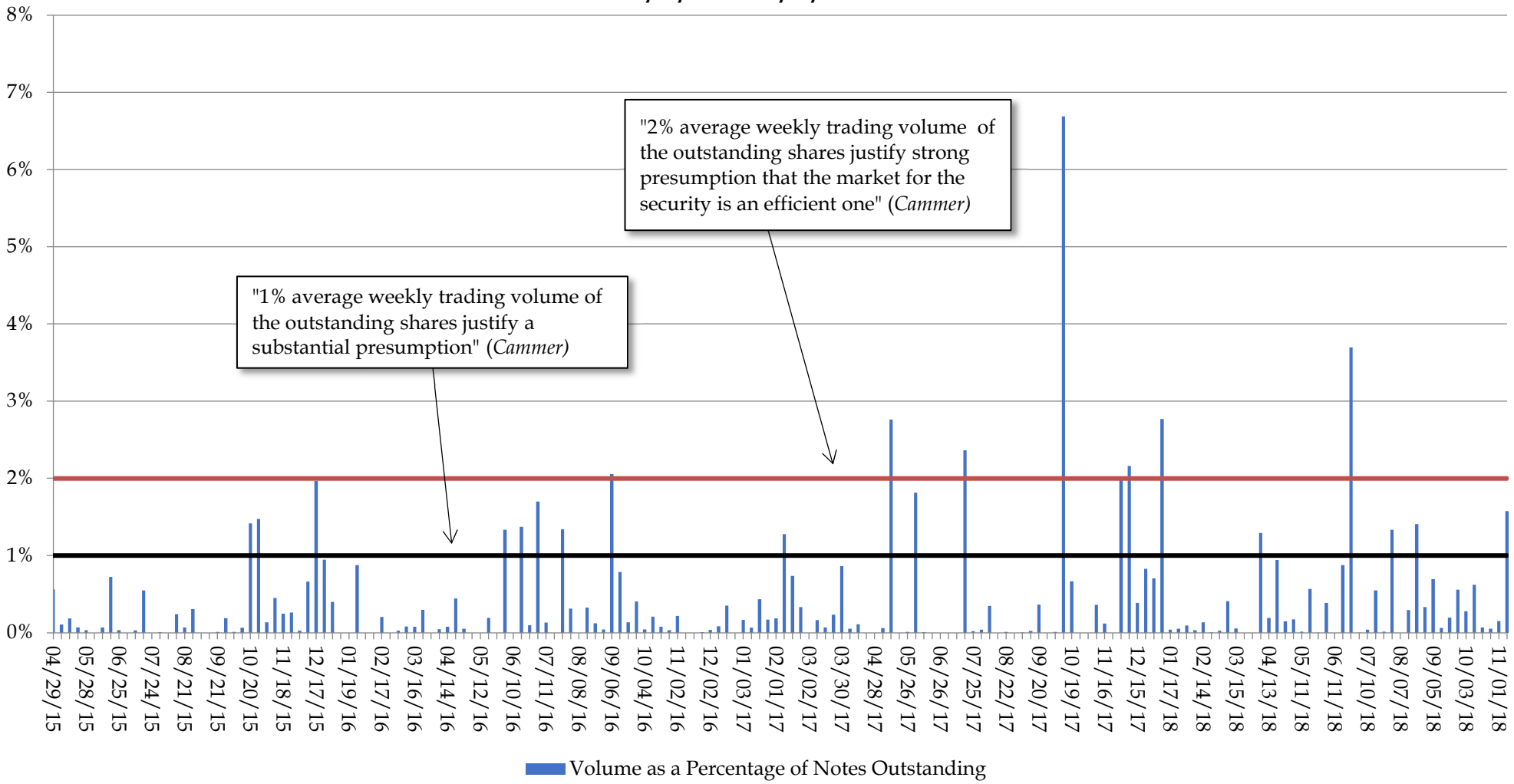
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.25% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HC4
4/29/2015 - 11/14/2018



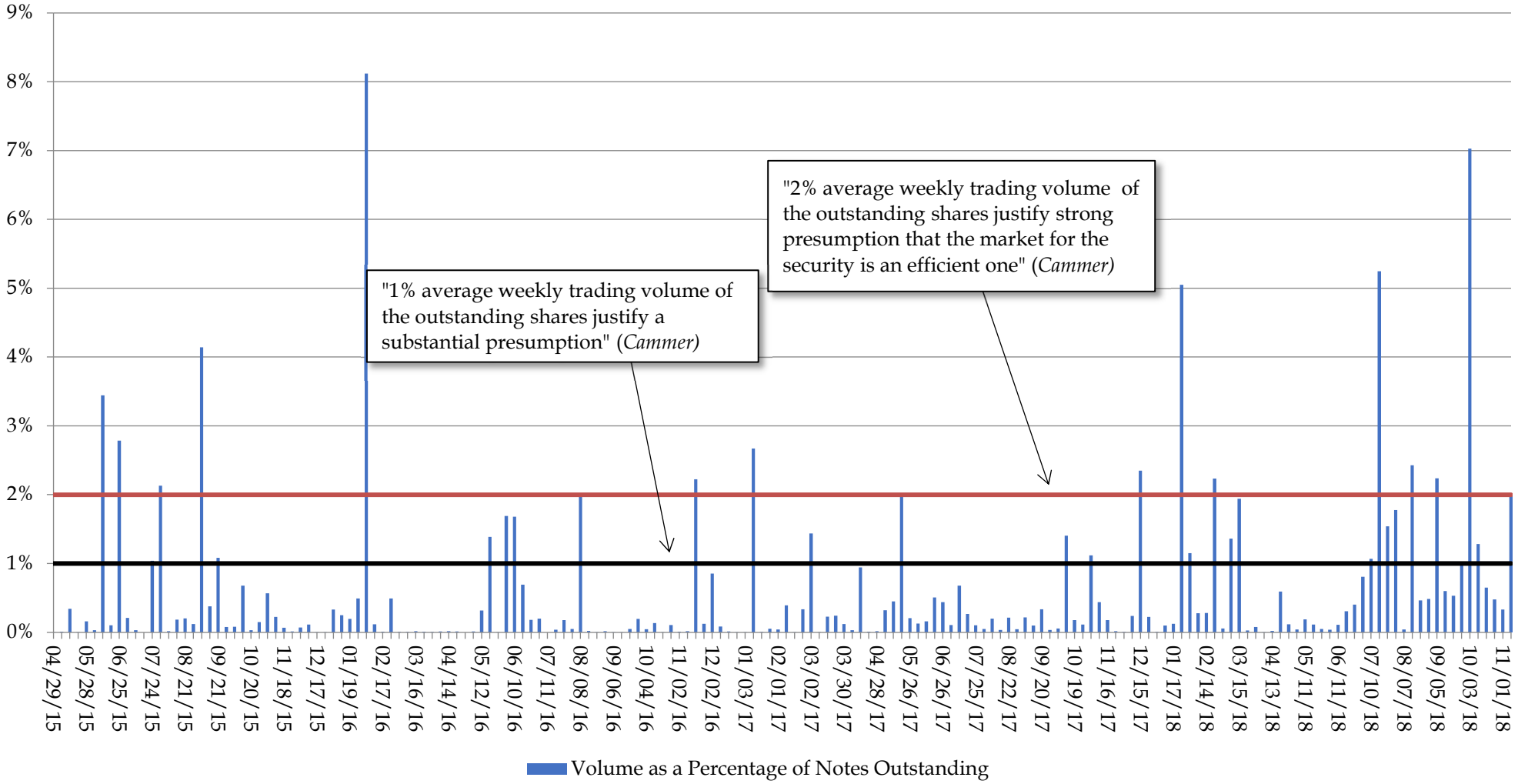
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.60% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308HD2
4/29/2015 - 11/14/2018



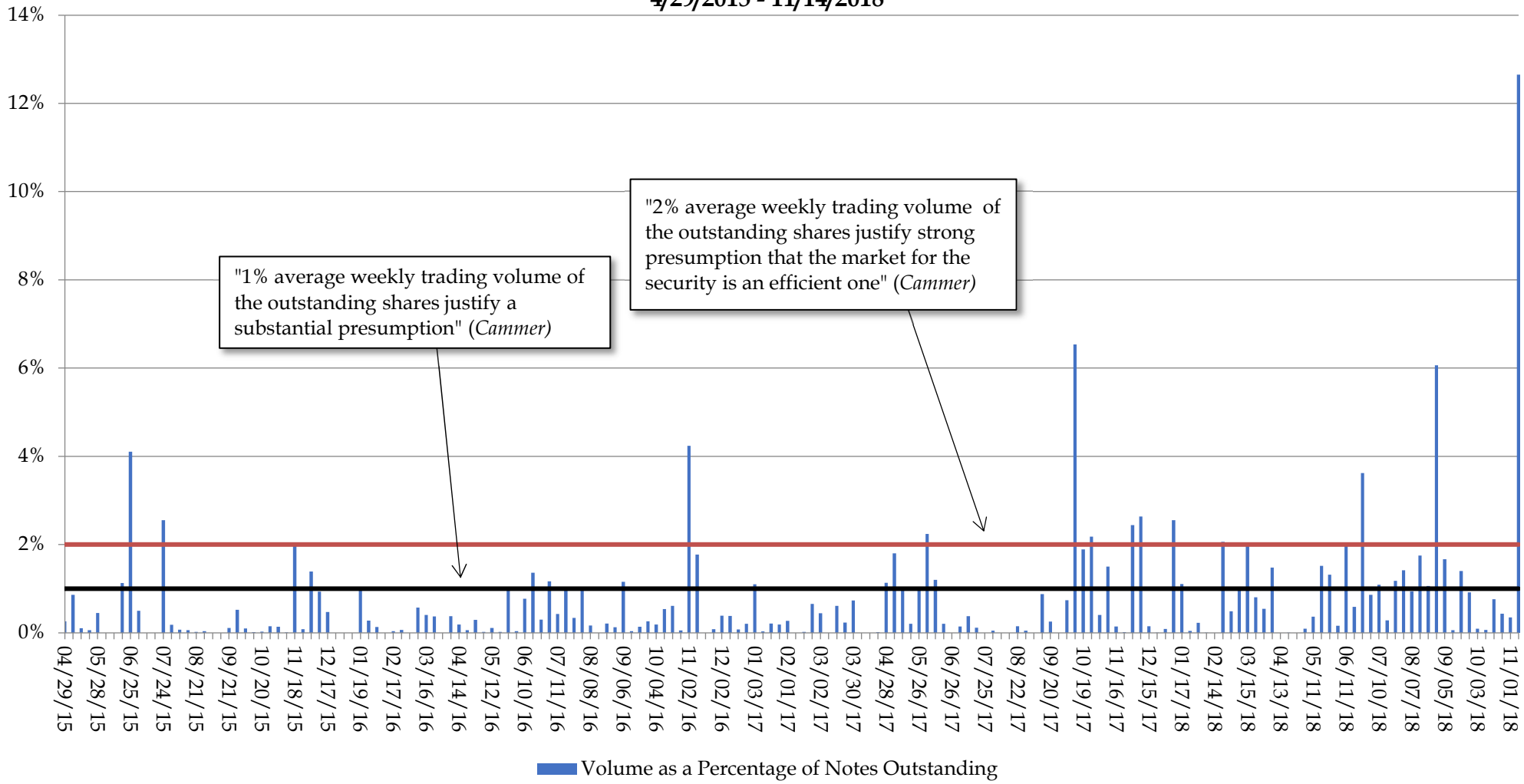
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.85% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HE0
4/29/2015 - 11/14/2018



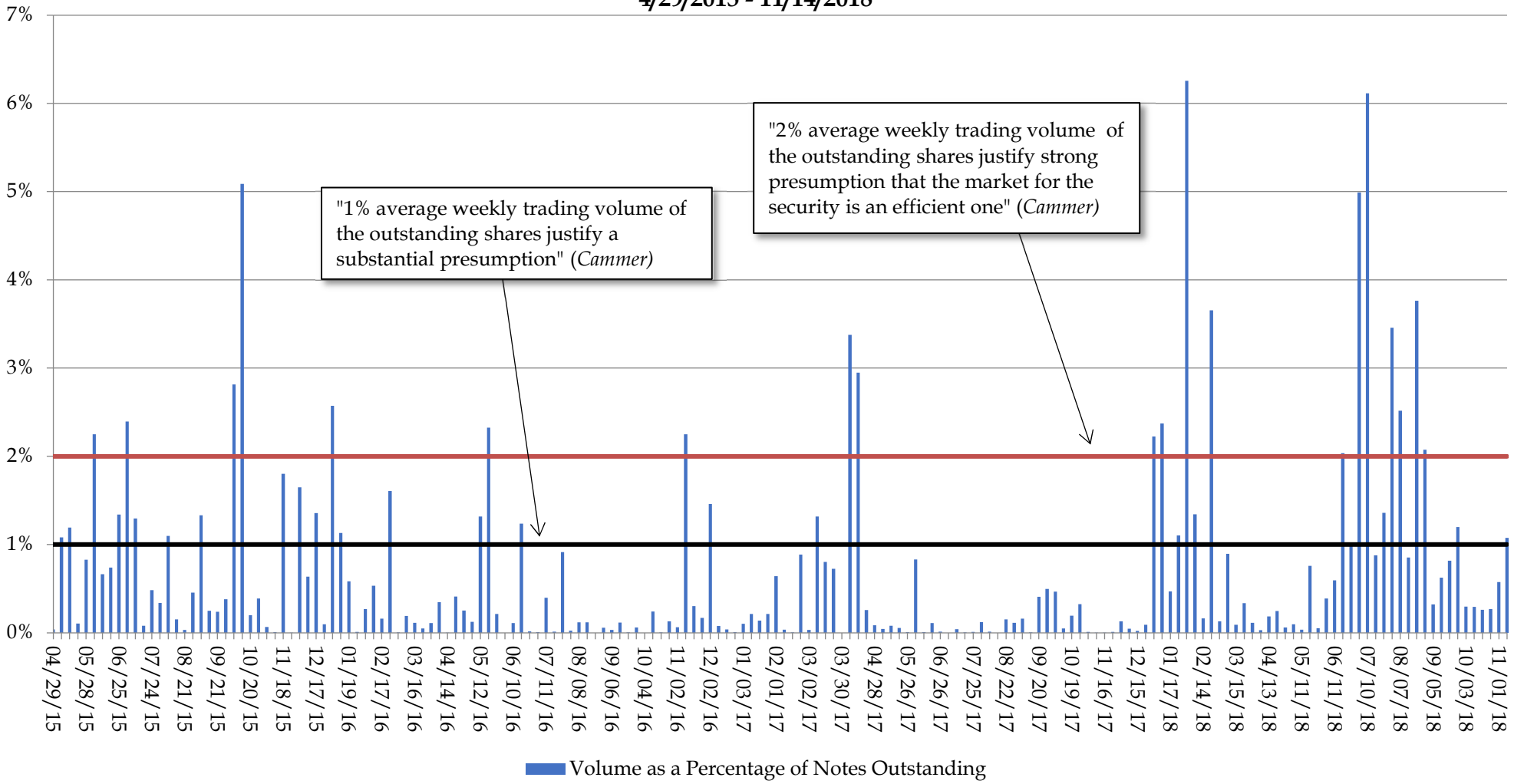
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 5.125% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HF7
4/29/2015 - 11/14/2018



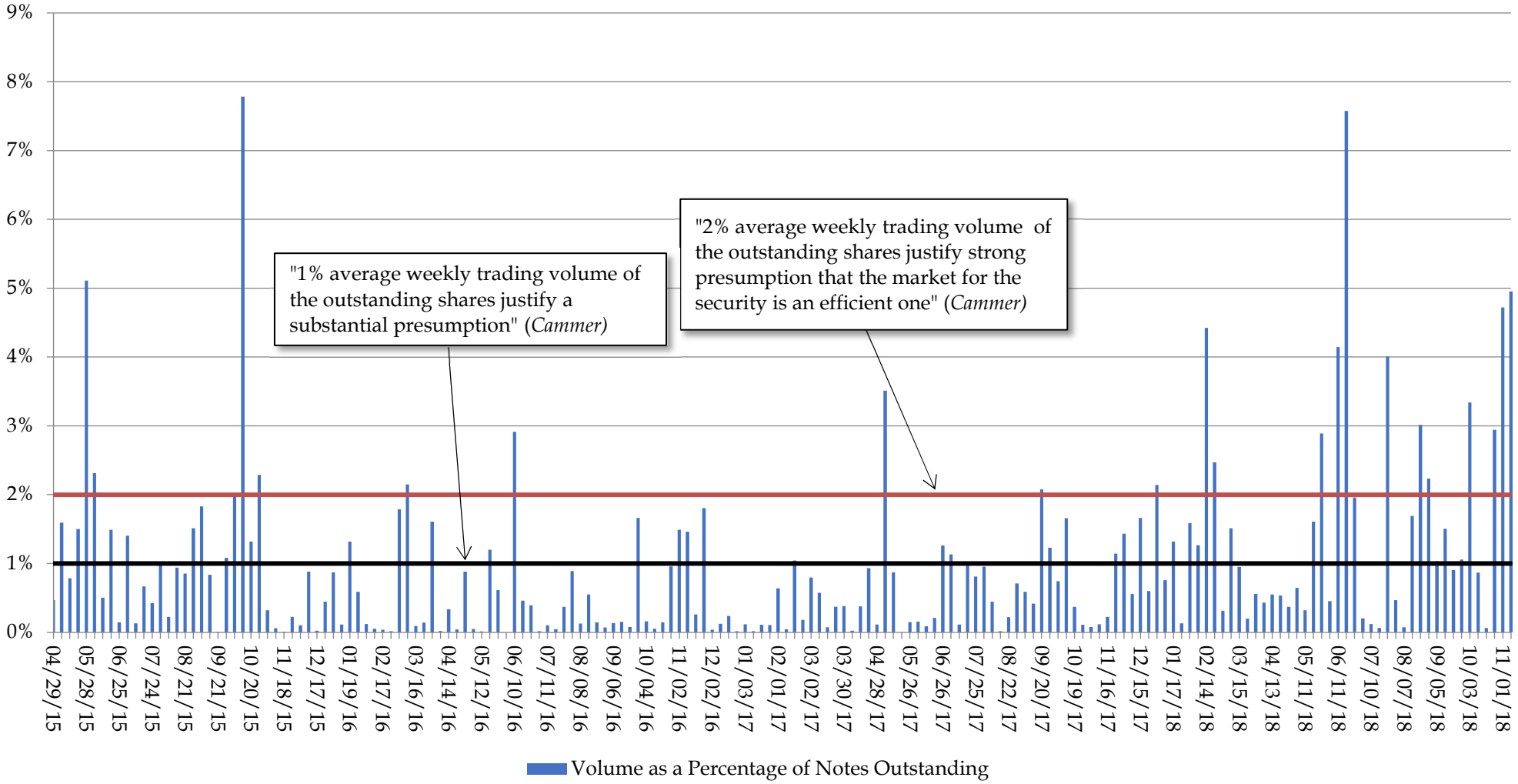
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.75% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HG5
4/29/2015 - 11/14/2018



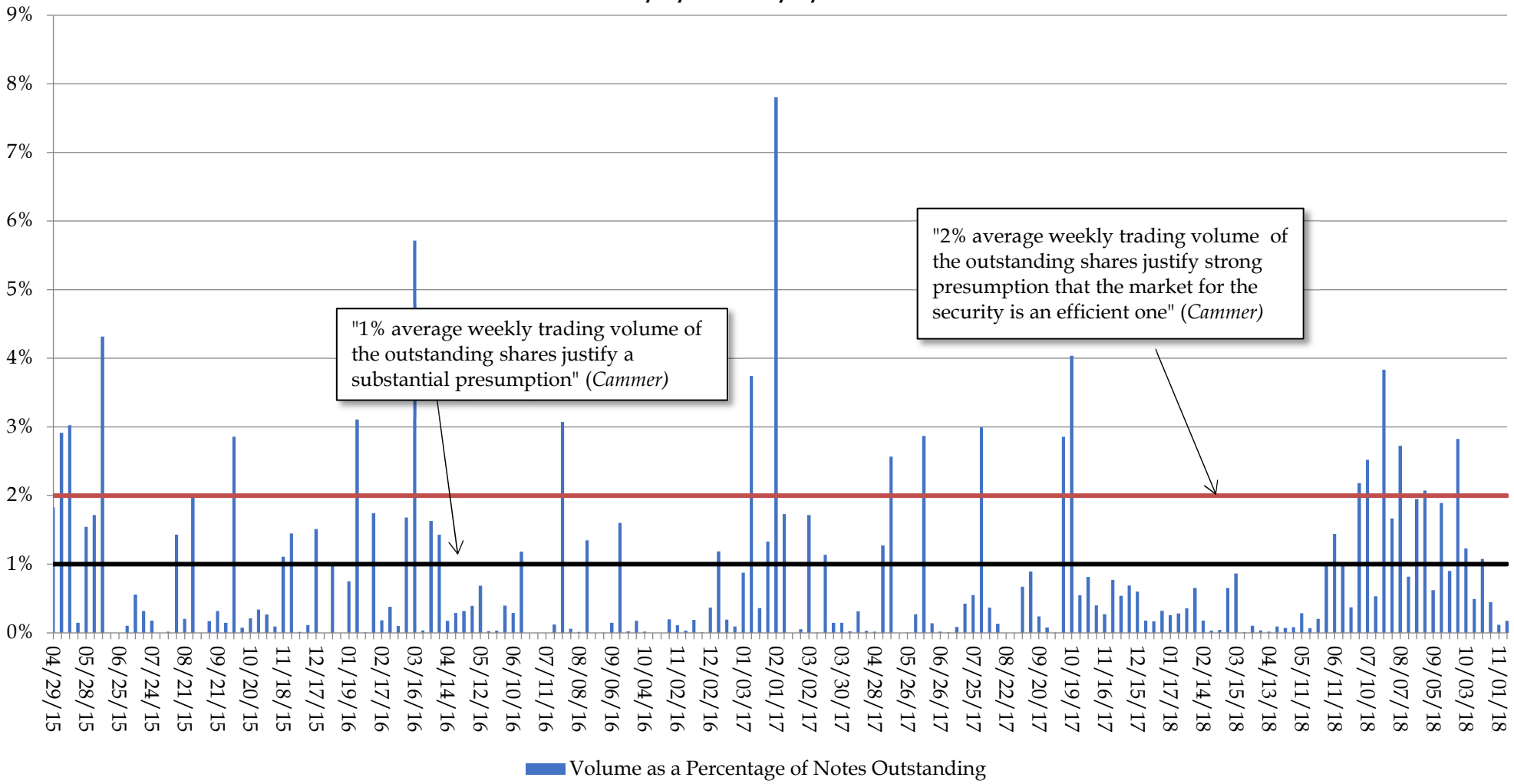
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.75% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HH3
4/29/2015 - 11/14/2018



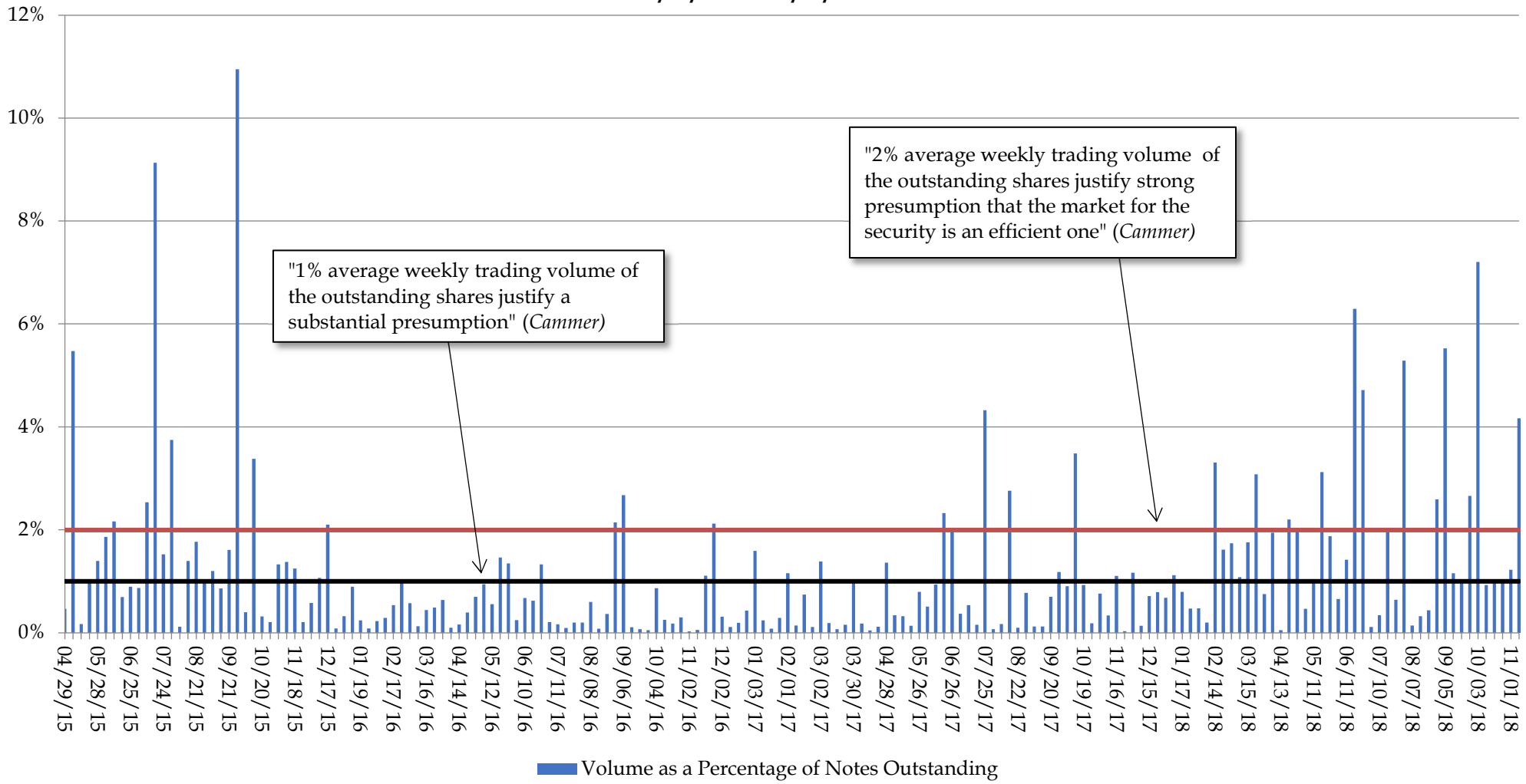
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.40% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HK6
4/29/2015 - 11/14/2018



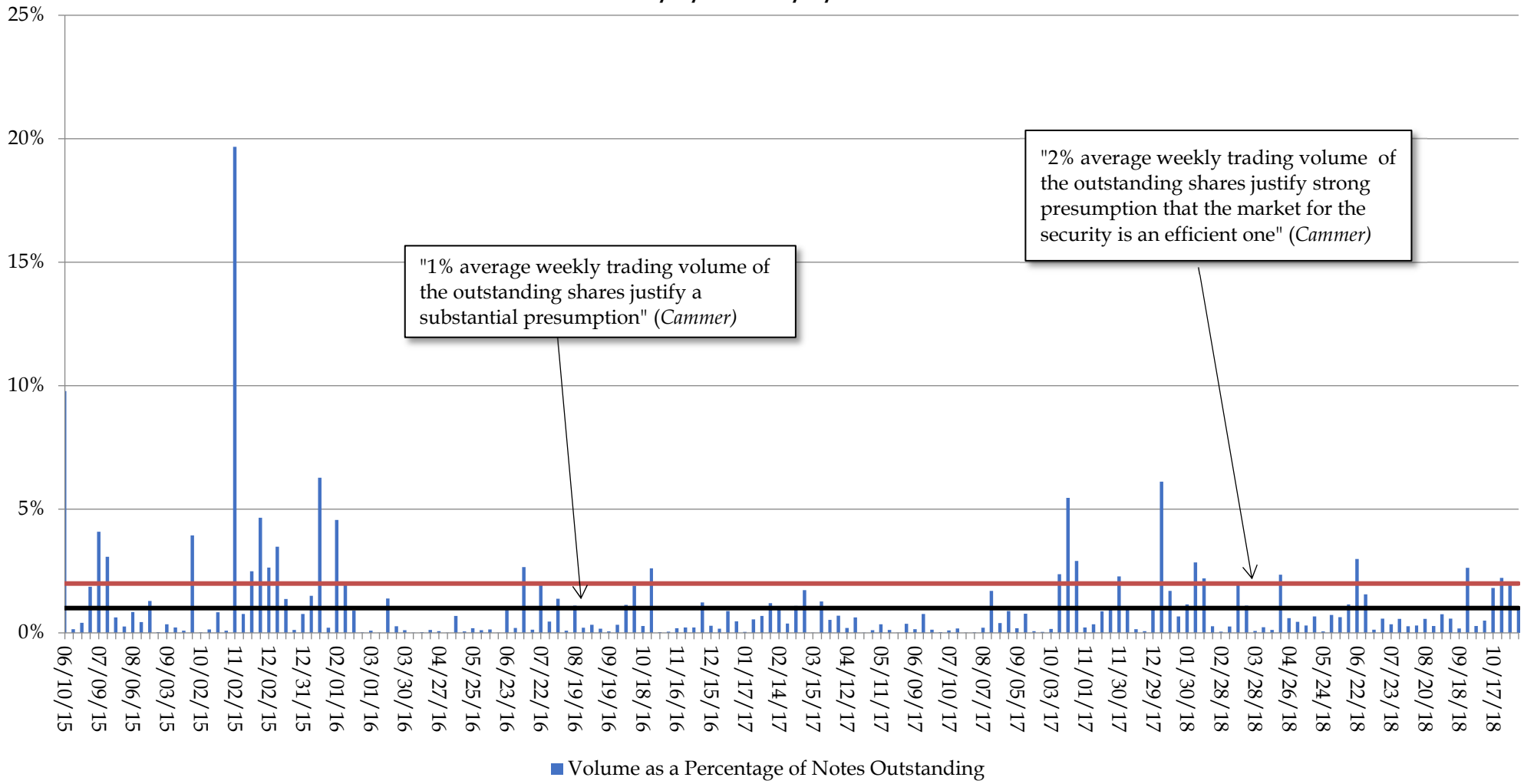
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.30% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308HL4
4/29/2015 - 11/14/2018



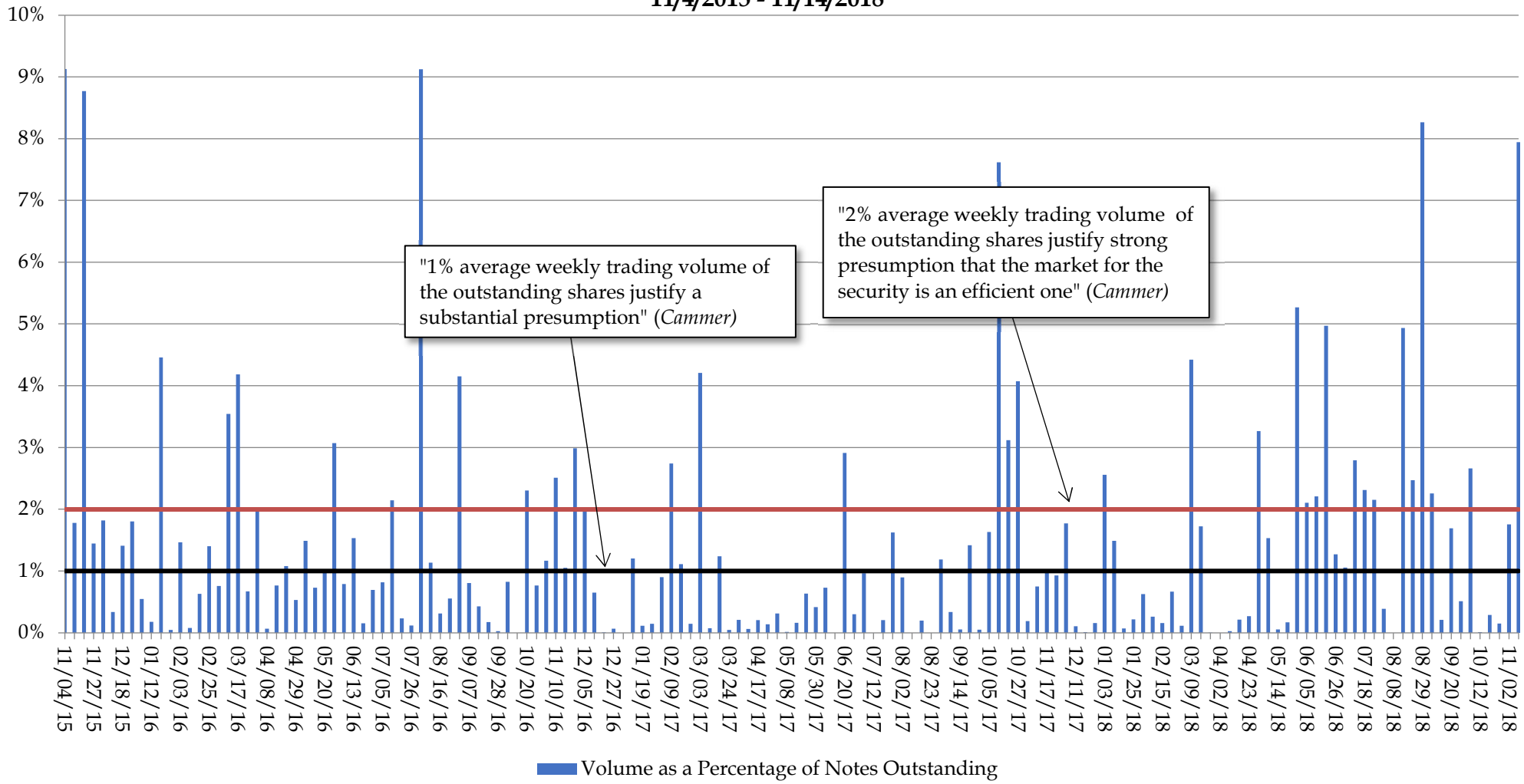
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 4/29/2015) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.50% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308HM2
6/10/2015 - 11/14/2018



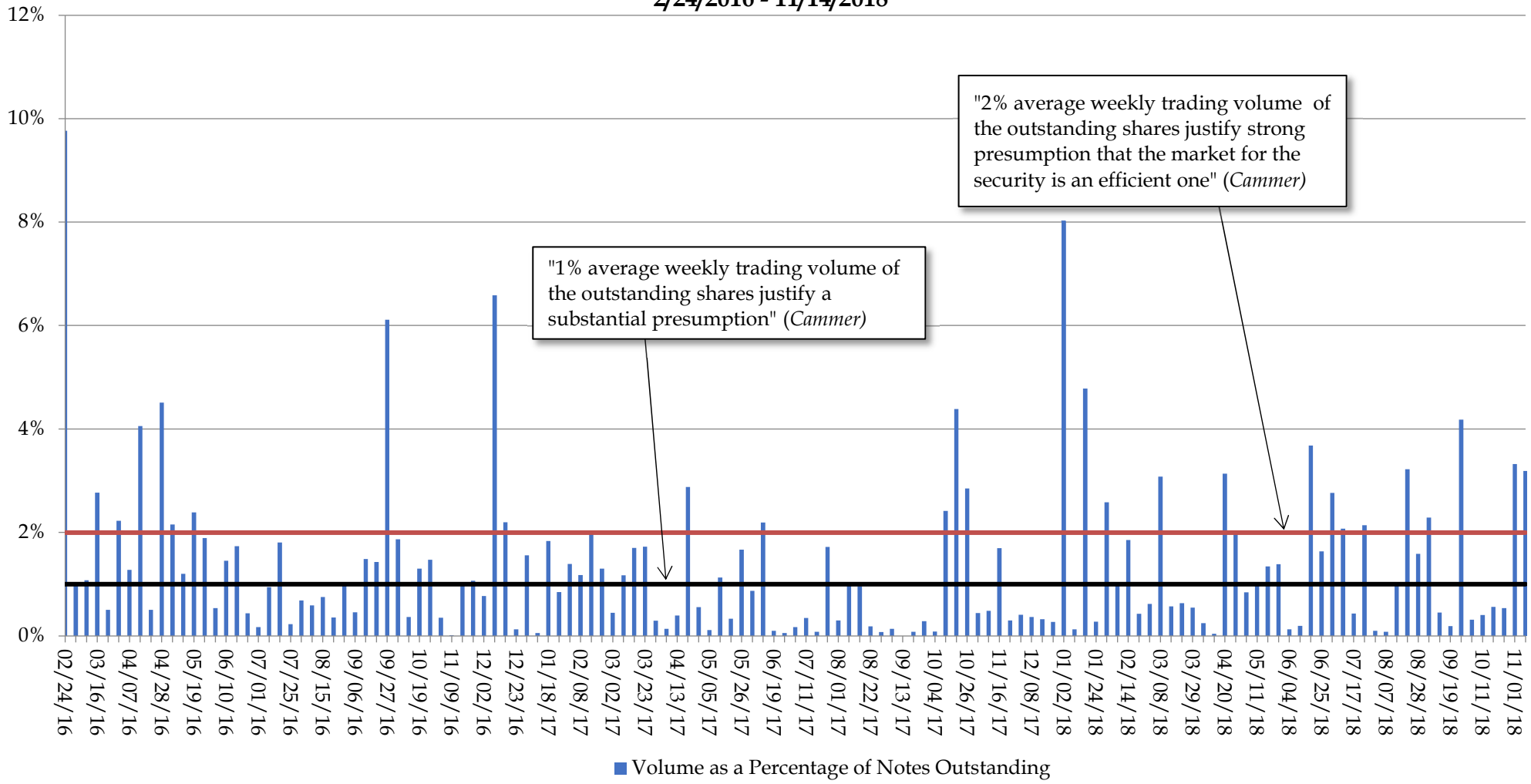
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 6/10/2015) through 11/14/2018.

Appendix D
PG&E 4.25% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308HN0
11/4/2015 - 11/14/2018



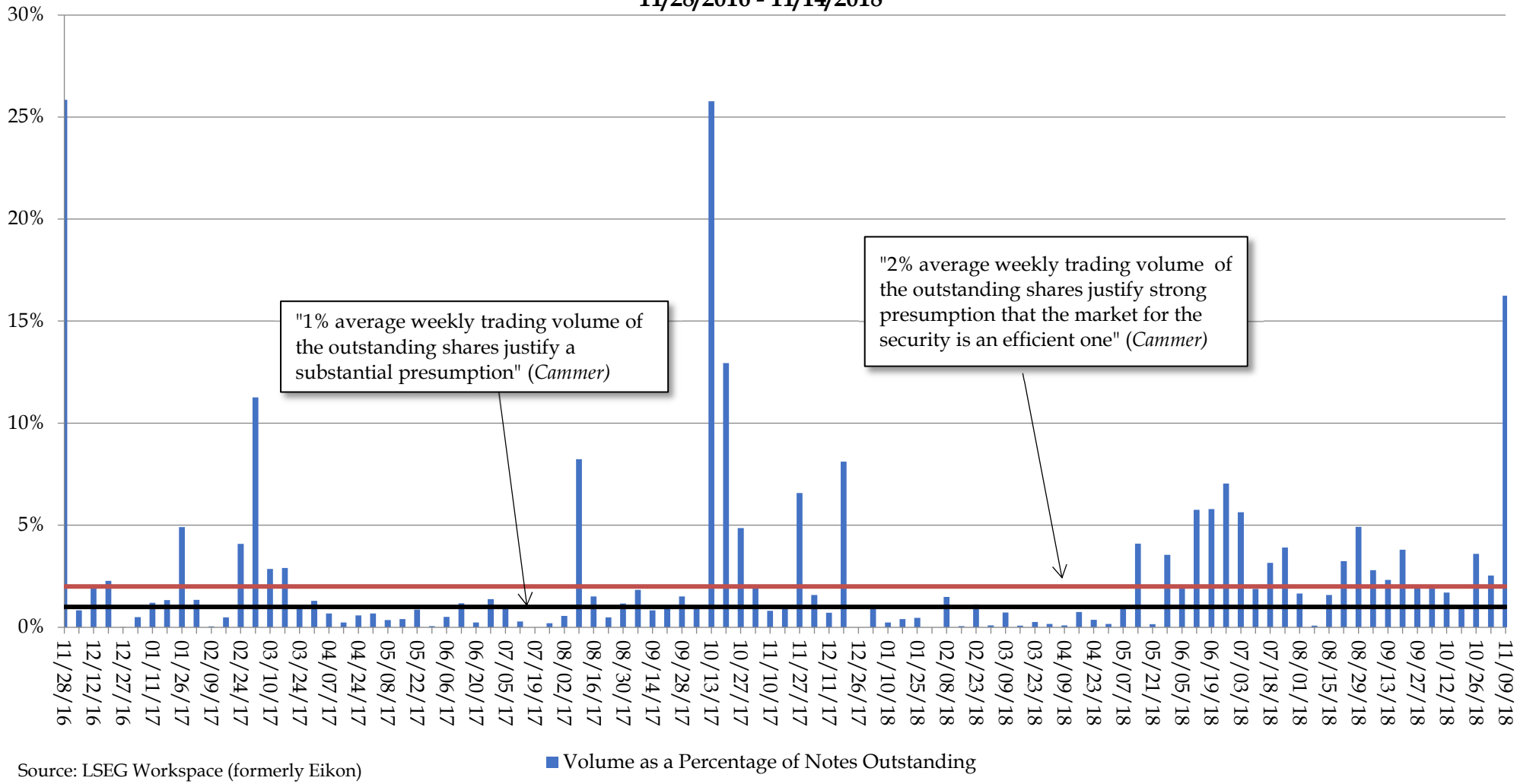
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 11/4/2015) through 11/14/2018. The last "trading week" during the Class Period only has 43market days, so it has been excluded from the median calculation since it is not a full

Appendix D
PG&E 2.95% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HP5
2/24/2016 - 11/14/2018



Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 2/24/2016) through 11/14/2018. The last "trading week" during the Class Period only has 4 market days, so it has been excluded from the median calculation since it is not a full week.

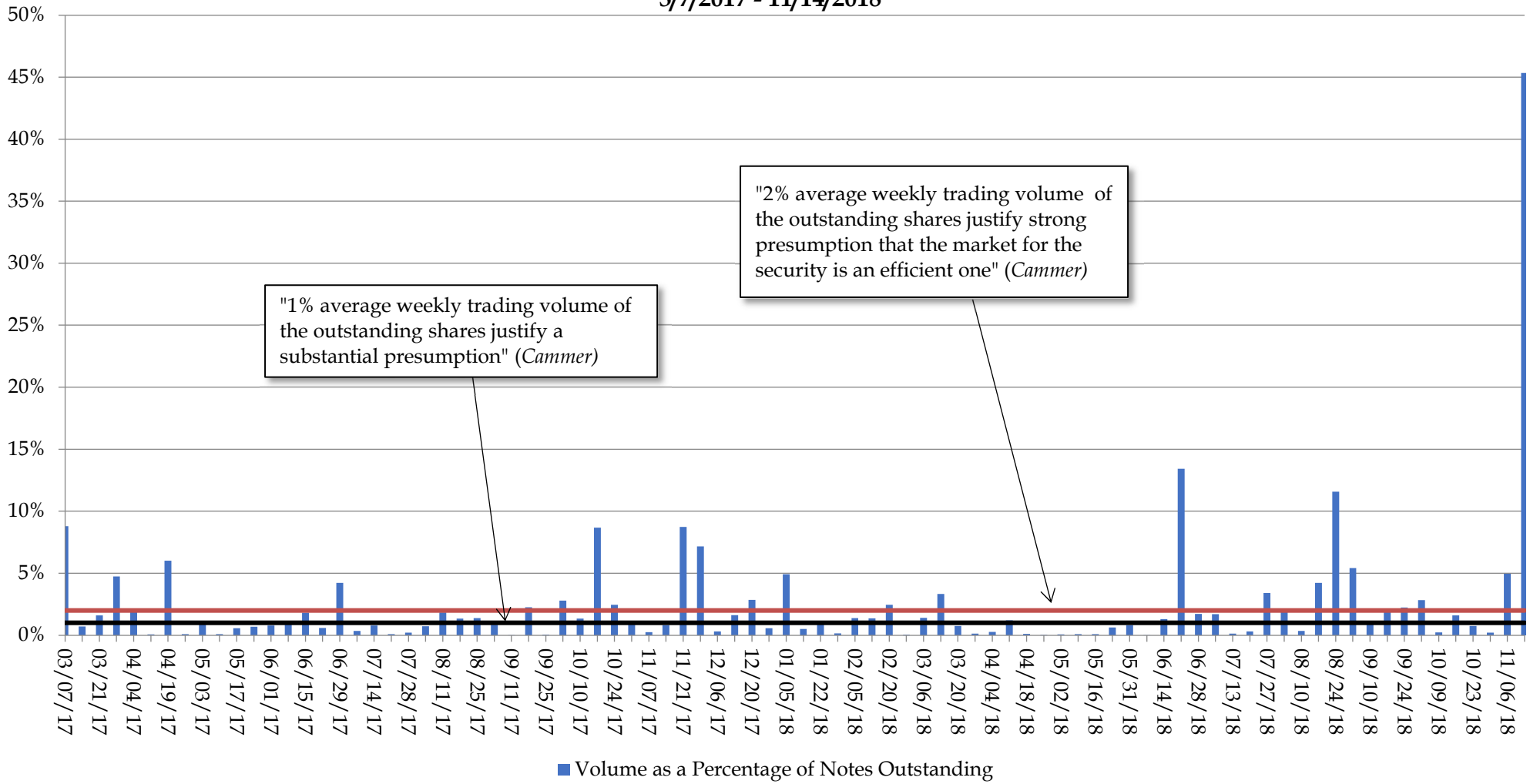
Appendix D
PG&E 4.00% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HR1
11/28/2016 - 11/14/2018



Source: LSEG Workspace (formerly Eikon)

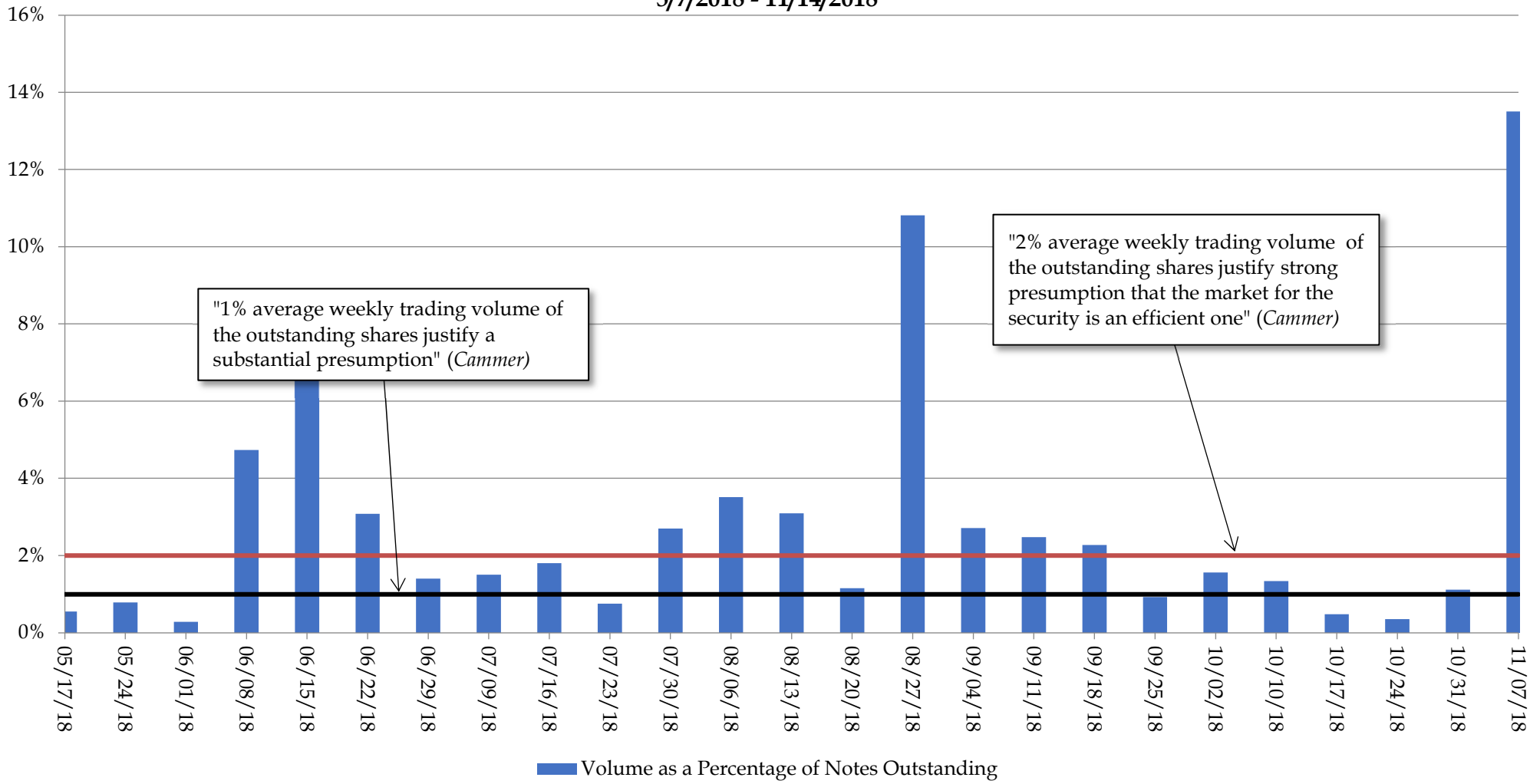
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 11/28/2016) through 11/14/2018. The last "trading week" during the Class Period only has 2 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.30% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HS9
3/7/2017 - 11/14/2018



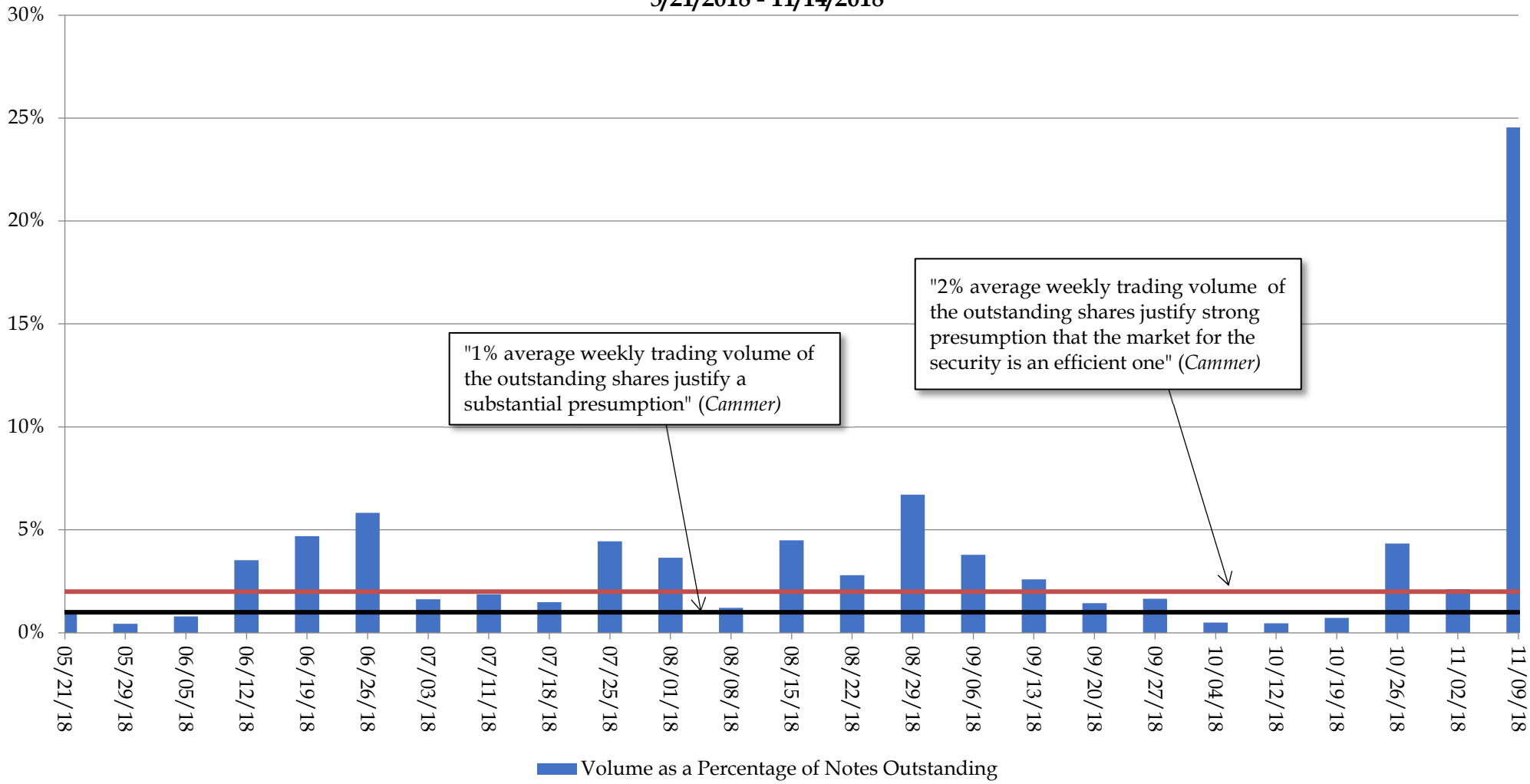
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 3/7/2017) through 11/14/2018. The last "trading week" during the Class Period only has 1 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 3.30% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HW0
5/7/2018 - 11/14/2018



Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 5/17/2018) through 11/14/2018.

Appendix D
PG&E 3.95% Note Average Weekly Trading Volume
as a Percentage of Notes Outstanding
CUSIP: 694308HY6
5/21/2018 - 11/14/2018

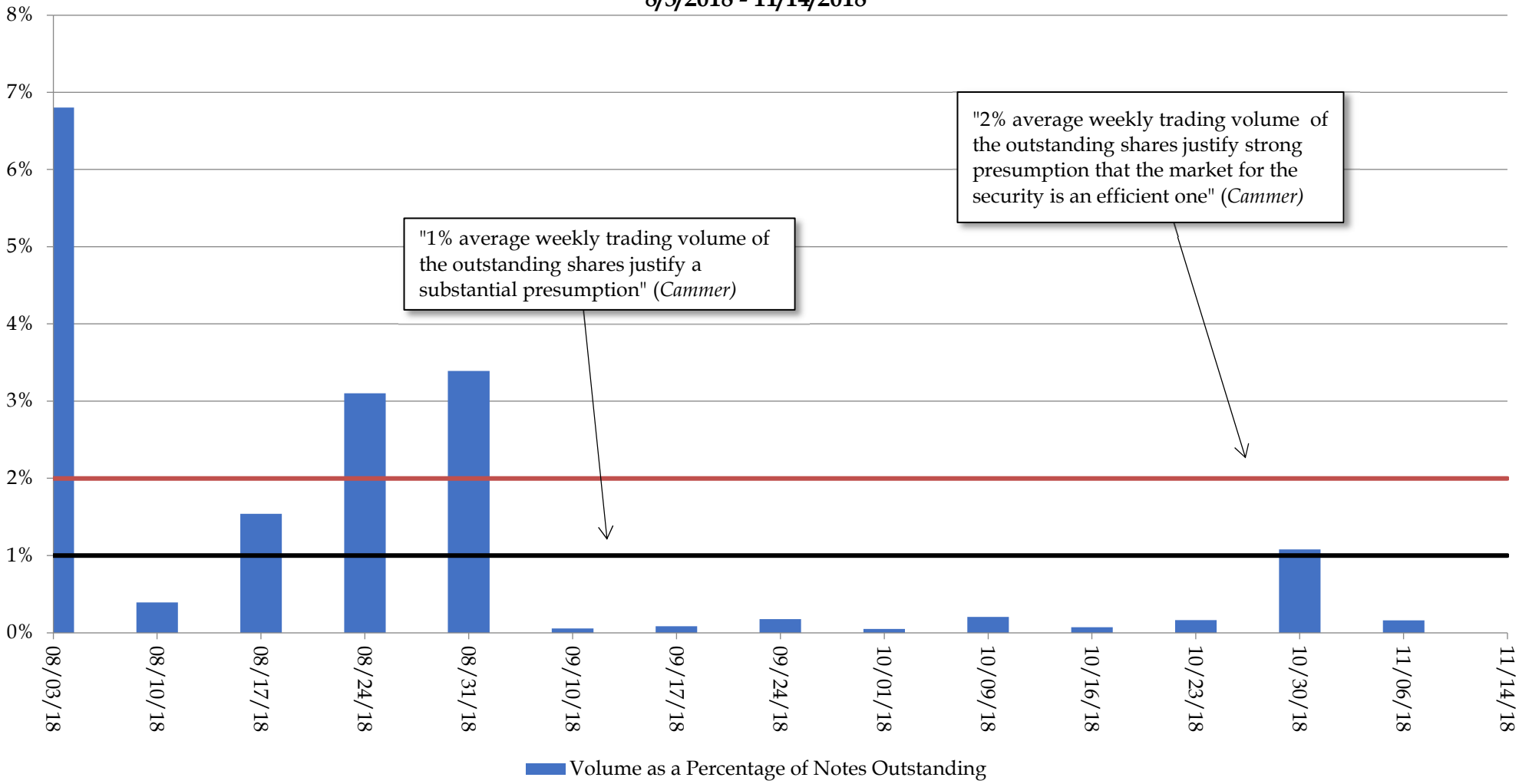


Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 5/21/2018) through 11/14/2018. The last "trading week" during the Class Period only has 3 market day, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.65% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308JA6
8/2/2018 - 11/14/2018

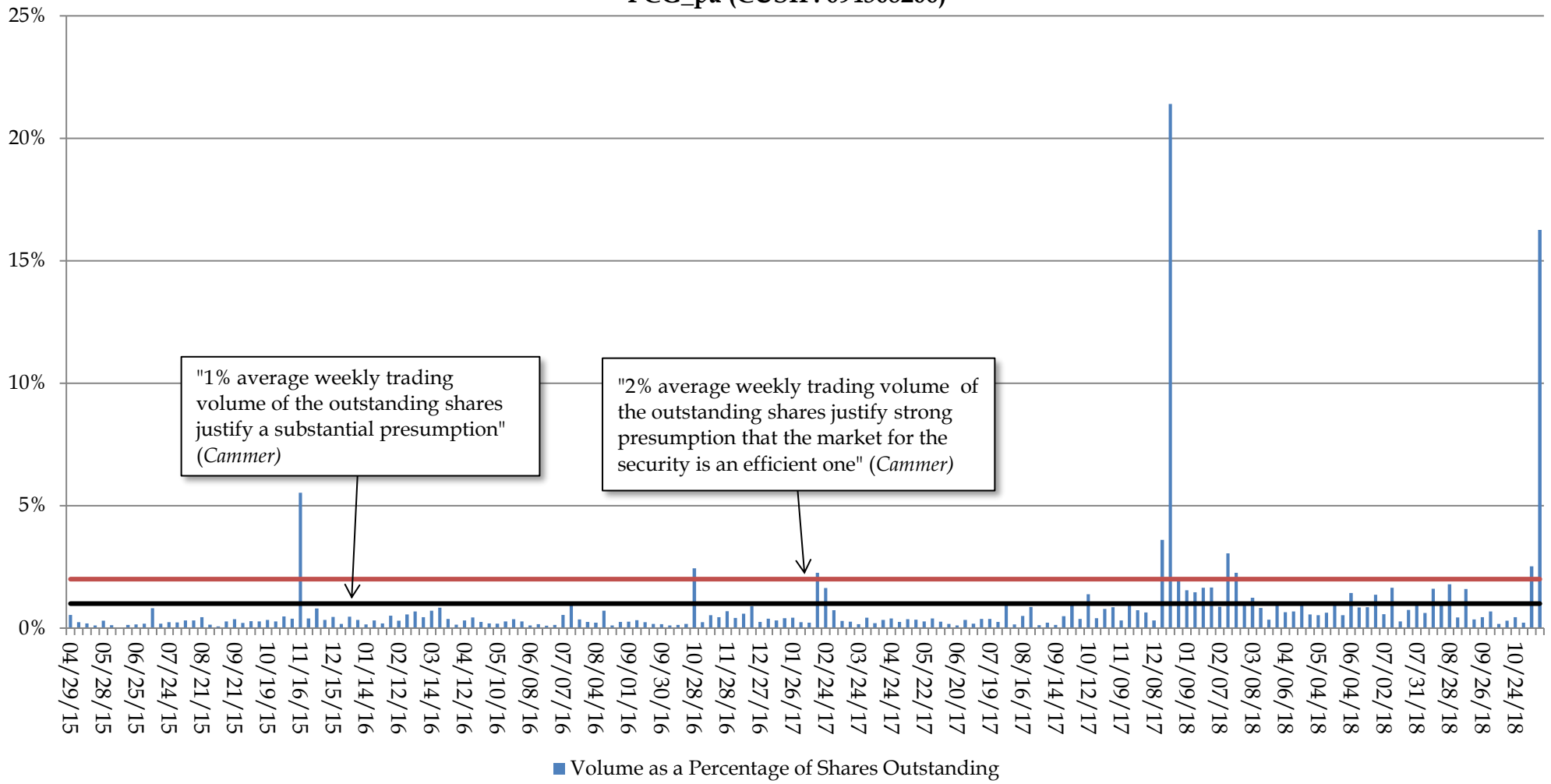
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 8/2/2018) through 11/14/2018. The last "trading week" during the Class Period only has 2 market days, so it has been excluded from the median calculation since it is not a full week.

Appendix D
PG&E 4.25% Note Average Weekly Trading Volume as a Percentage of Notes Outstanding
CUSIP: 694308HZ3
8/3/2018 - 11/14/2018



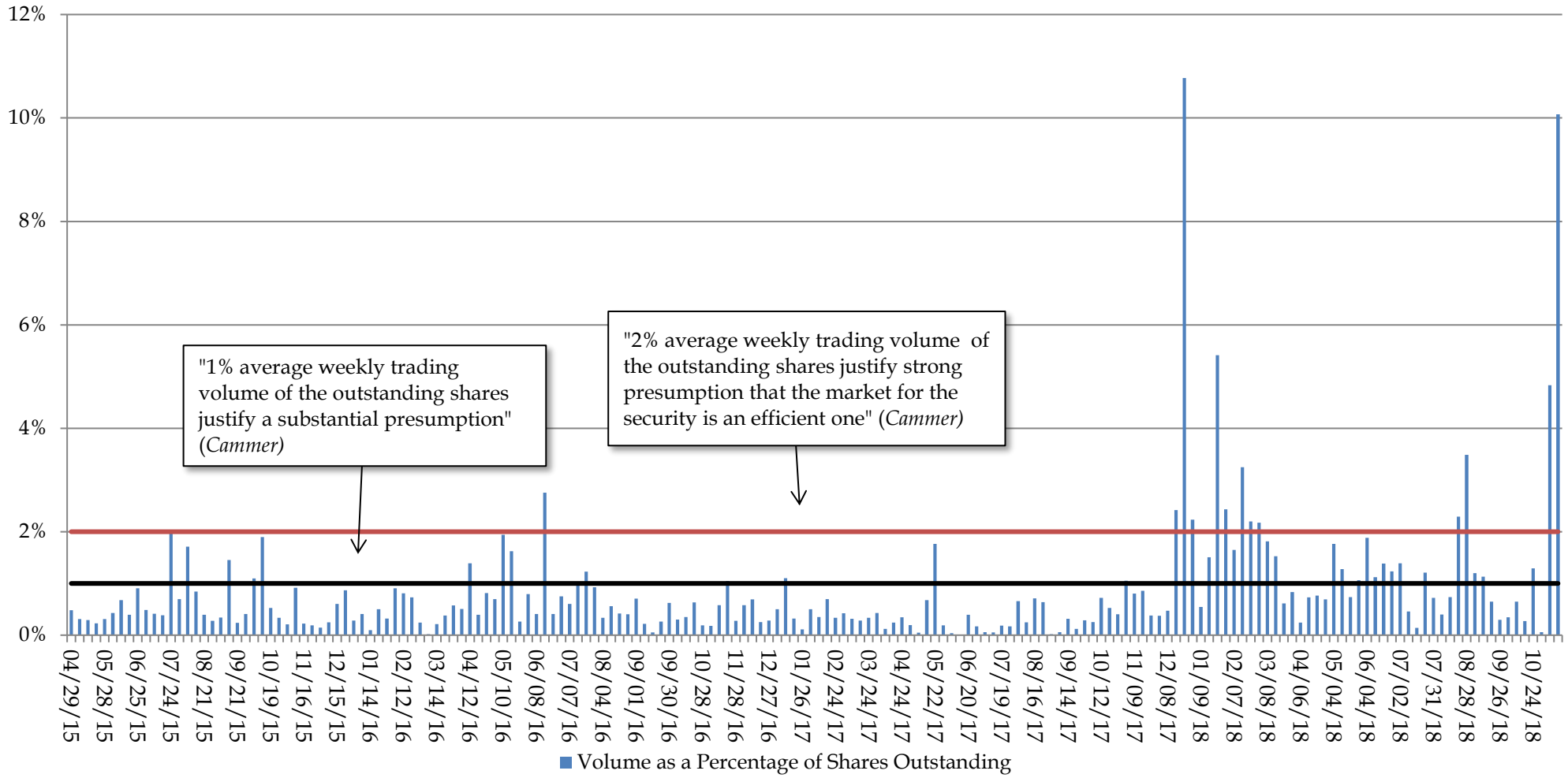
Source: LSEG Workspace (formerly Eikon)
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the note data (i.e. 8/3/2018) through 11/14/2018. The last "trading week" during the Class Period only has 1 market day, so it has been excluded from the median calculation since it is not a full week.

Appendix E
PG&E 6.00% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pa (CUSIP: 694308206)



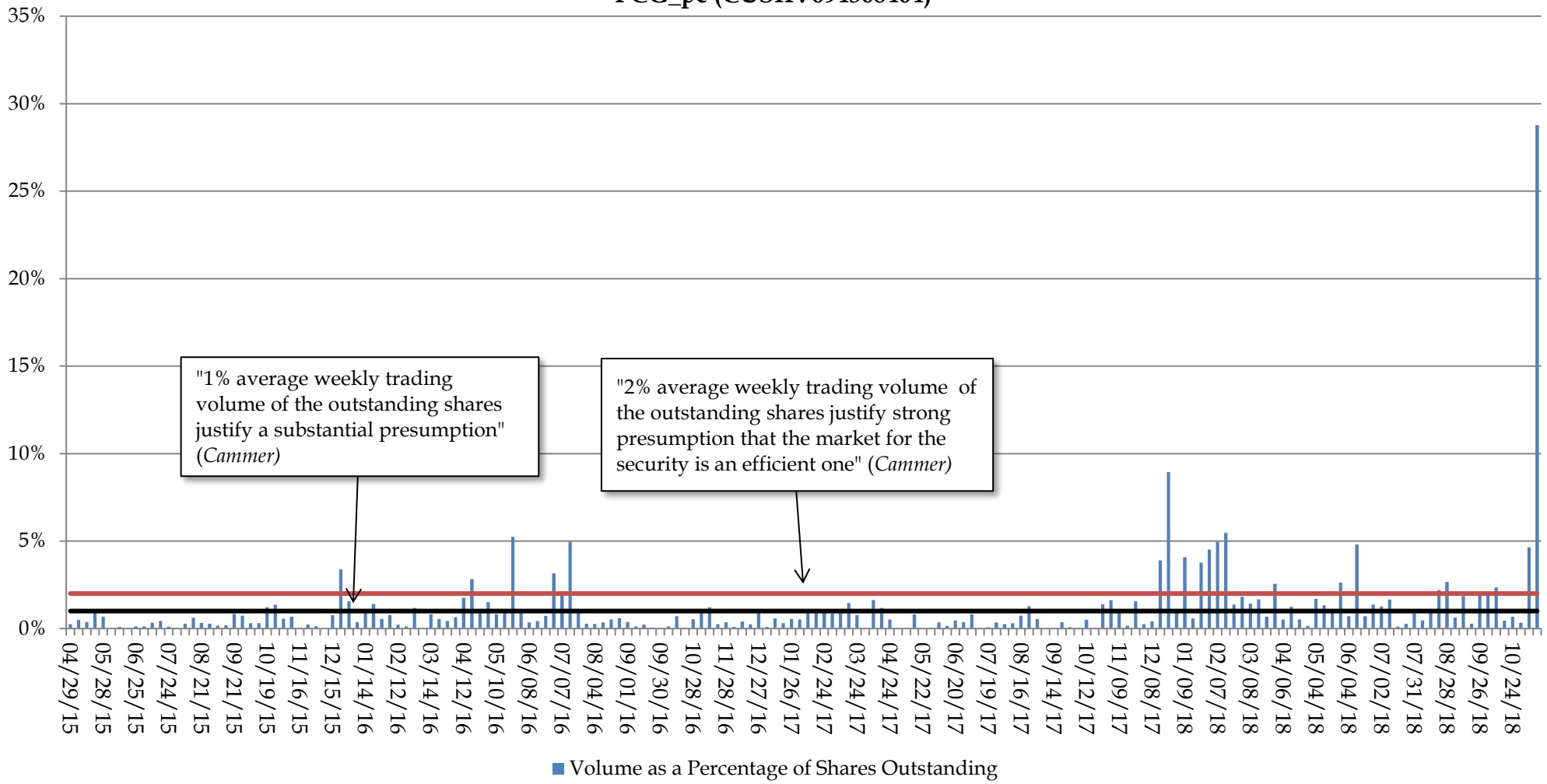
Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 5.50% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pb (CUSIP: 694308305)



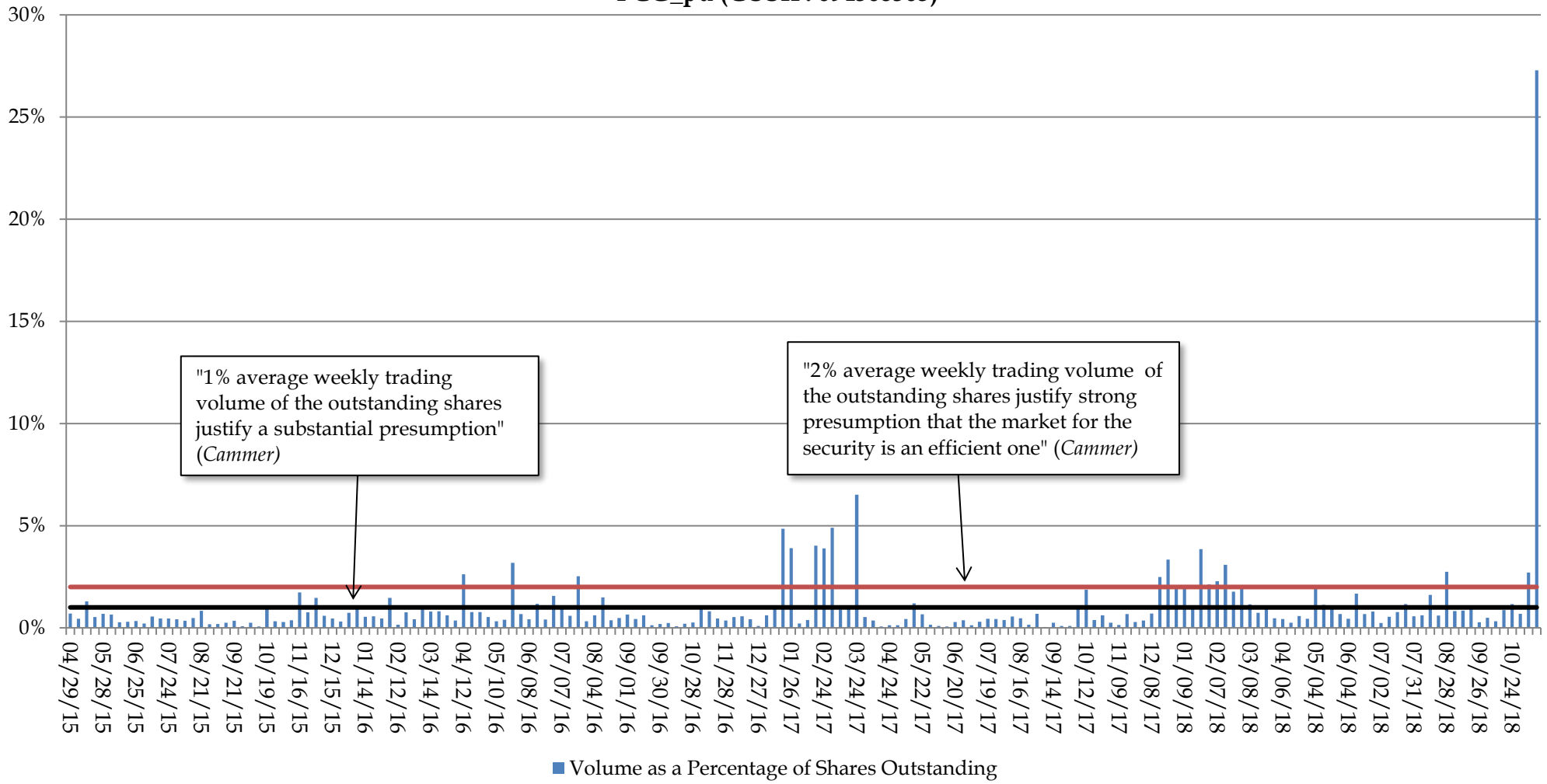
Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 5.00% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pc (CUSIP: 694308404)



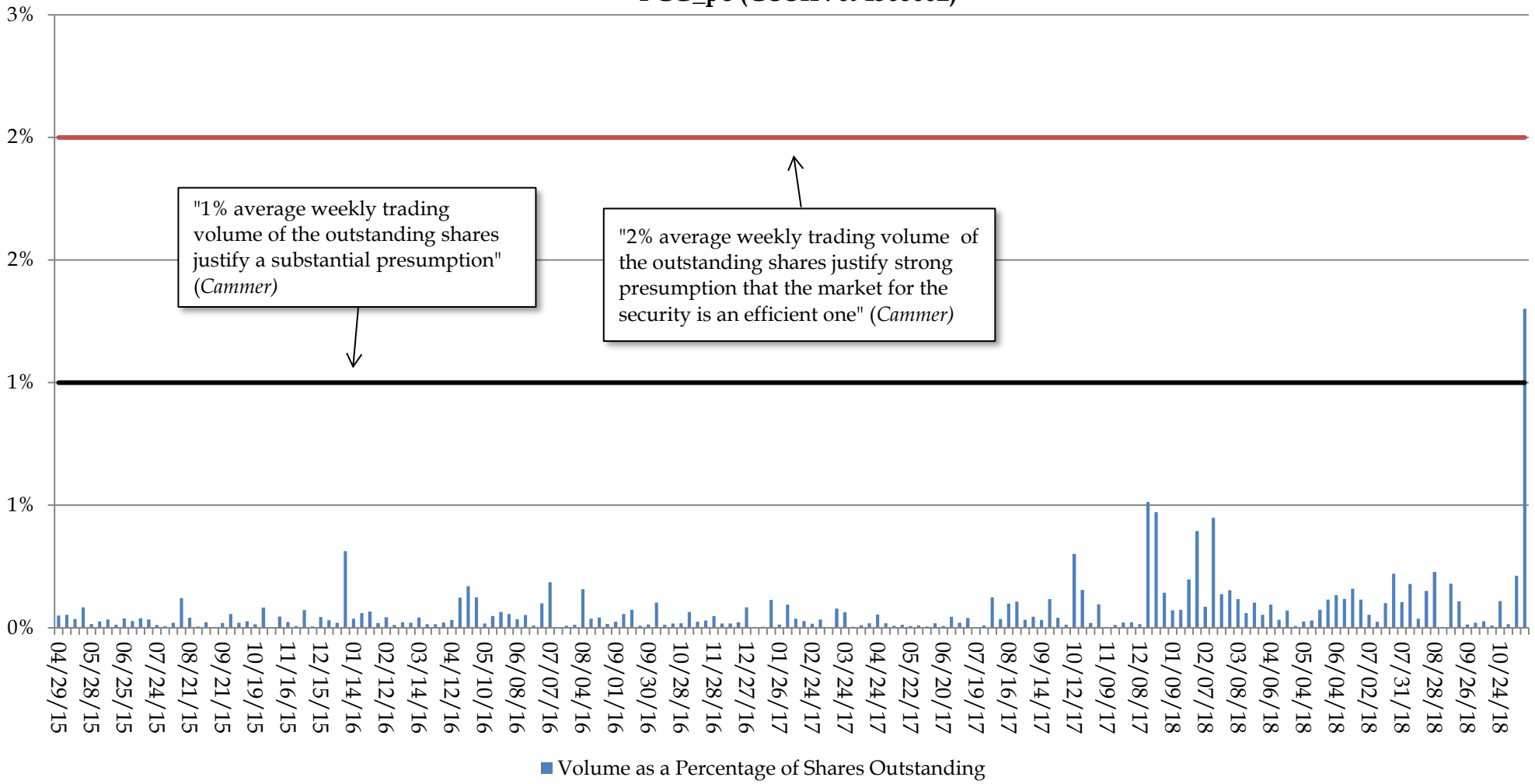
Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 5.00% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pd (CUSIP: 694308503)



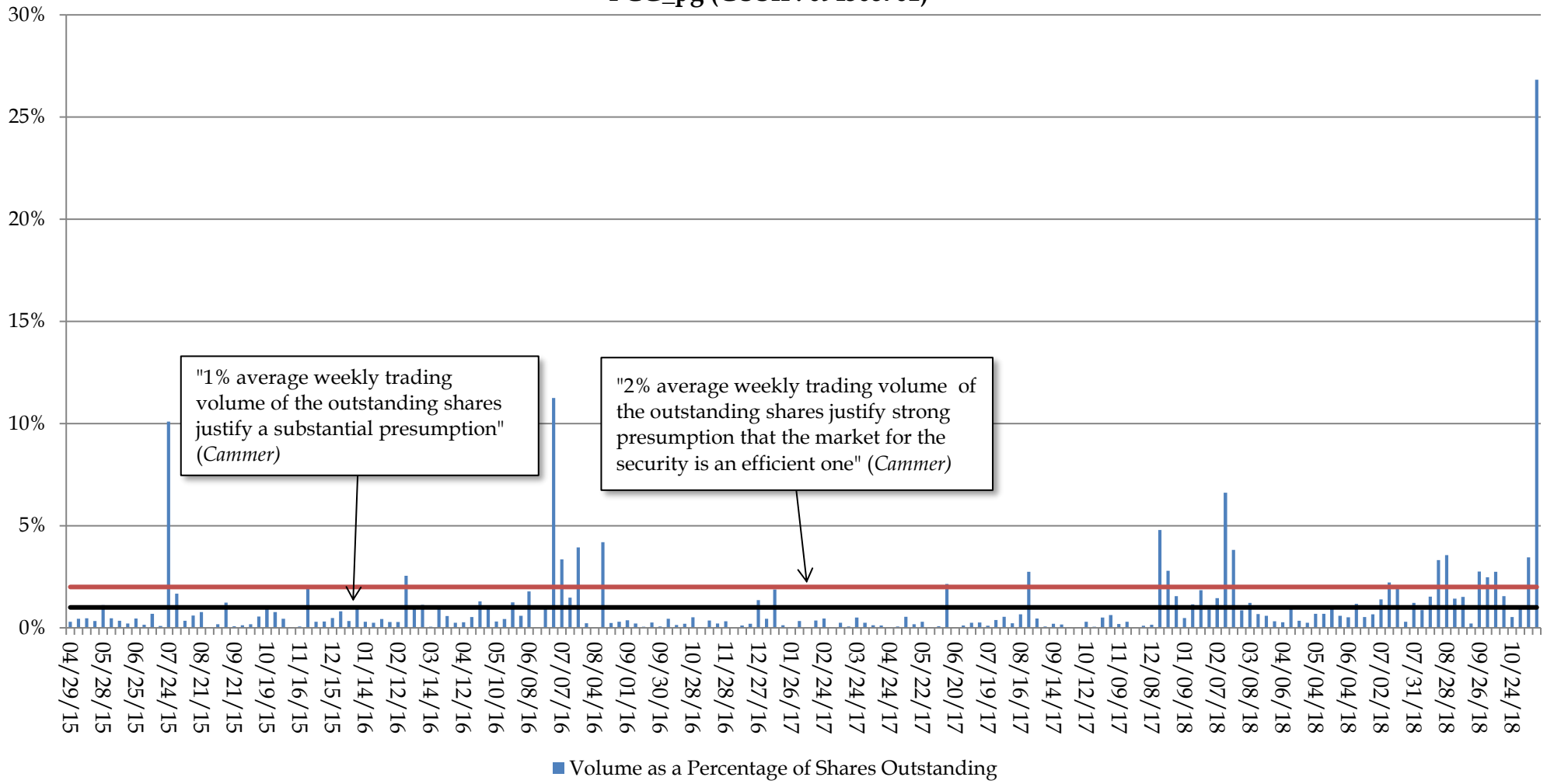
Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 5.00% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pe (CUSIP: 694308602)



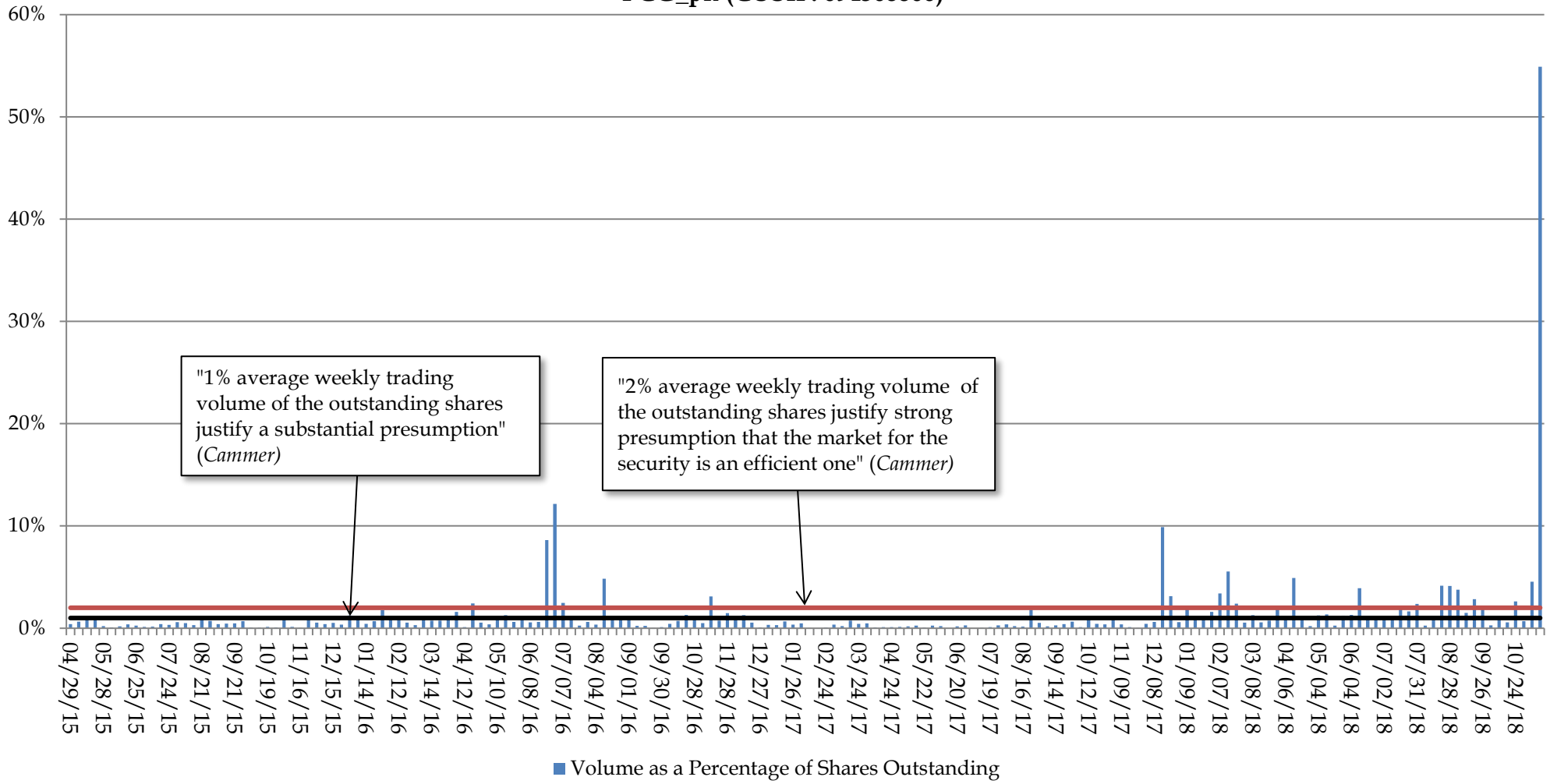
Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 4.80% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pg (CUSIP: 694308701)



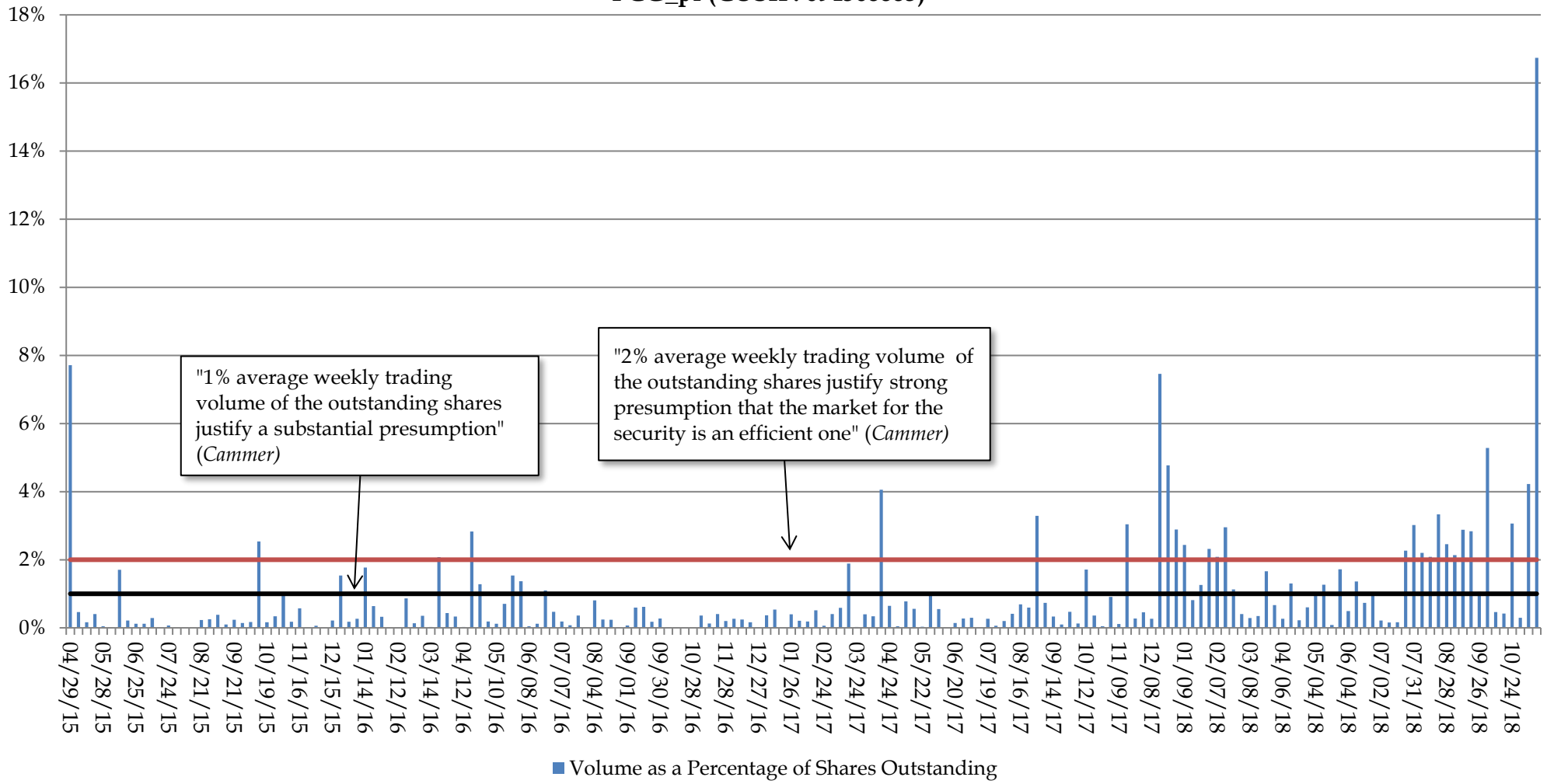
Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 4.50% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_ph (CUSIP: 694308800)



Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.

Appendix E
PG&E 4.36% Preferred Stock Average Weekly Trading Volume as a Percentage of Shares Outstanding
4/29/2015 - 11/14/2018
PCG_pi (CUSIP: 694308883)



Source: S&P Capital IQ.
Note: Average weekly trading volume is calculated by analyzing each five consecutive trading days (rather than calendar weeks) starting with the first day of the Class Period on April 29, 2015 through November 14, 2018. The last week consists of one trading day (i.e., 11/14/2018), and therefore, the average of the daily trading volume on this week is multiplied by five to get a comparable measure for the average weekly trading volume as a percentage of shares outstanding. The last week is excluded from the median calculation.